The Builder.

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NATIONAL Art-Education, and the machinery for effecting it, are matters of no trifling moment, and call for serious attention.

The statements made by Mr. Redgrave at the distribution of national medals concerning the expense of teaching drawing in parochial schools, and the *instructions* for those who wish to obtain the services of an art-certificated master, seem to have created among the masters in connection with the Department of Science and Art a feeling of insecurity, and, according to the letters which have appeared in our pages, and a dozen which have not, no small discontent also.

It may be well, at some future time, to examine this and other matters in connection with it thoroughly, in order to discover the real facts concerning it, as well as to take a general view of the means that are being employed for the spread of art-education by the department. At present let us take a cursory glance.

There are two classes of masters of schools of art. One is composed of those who, under the School of Design system, received appointments with an annual government grant made towards their salary; the other, of men who have been trained in the central school in London, and receive their appointments from the Department of Science and Art; the contribution towards the salary of the latter being in the form of payments on certificates of competency awarded by the department. Thus, a man who possesses certificates for one branch of art, receives 10*l.* annually: possessing certificates for two branches of art, he receives 20*l.*; and so on. The practical difference in the allowance to the two classes is, that a master appointed under the School of Design may receive 300*l.* a year from Government, and one who holds his appointment from the Department (if he is a very clever fellow) may receive 30*l.* It is the latter class who will be affected by the new regulations; and, as they are the types of all future school-of-art masters, what affects them will affect all future appointments. There is also another difference in the position of the two men; for, whilst the fortunate possessor of an appointment from the School of Design teaches only in his central school, and in what other places, on whatever terms, he chooses,—the departmental master has to work a fixed number of hours per week, in whatever places, and upon what terms, the School of Art committee and other people arrange for him. It would be thought from this that the recently-appointed teachers are inferior men to their seniors in office, but a glance at the subjects for examination for the higher certificates obtained by the former, and a comparison of the condition and operations of the lately-established with the older schools, will lead to a very different conclusion. Here then are two sets of men engaged in the same occupation, but not with the same amount of work, and vastly disproportioned remuneration. Those who work the hardest, and have the least pay, are fearful, and it may be not without some cause, that the new regulations will still further diminish their salaries; at the same time asking that all masters doing a certain amount of work shall have equal remuneration. This is a subject well deserving the careful consideration of the Department; and when it receives such consideration, it is to be hoped that the Department will be no longer bound by the grave-clothes of the School of Design, but on its own responsibility settle the matter equitably for both sides.

But without entering deeply into the matter, let us see what are the functions of the art-certificated master, and take an impartial glance at the position in which he is placed.

The avowed object of the Department is the art-education of the people, the opening up of new thoughts, and the placing in the hands of the lower classes a medium of expression and a weapon for work which have hitherto not been possessed by them. The obvious reason for this is, that it must necessarily increase national prosperity; for, by making us a more artistic and a more intelligent people, by teaching us the relation that thoughts bear to things, in cultivating the one and facilitating the production of the other, we become more independently powerful, more productive, and, consequently, more wealthy. This is the business view of the case, and one, too, not to be neglected. Another aspect which the work of the Department may assume is a moral one. The possession of a good eye and an educated hand must necessarily carry with it something besides its mere mercantile value. It is a key to the ignorant, by which they may unlock for themselves the door of beauty, and lay open to their eyes the inexhaustible treasures of nature. Indeed, the possession of a cultivated perception is an incessant note of interrogation to all that is passively beautiful in nature or wonderful in art. And however much we have hitherto ignored the fact, yet the ultimate influence on the lower classes of a knowledge of the beautiful, and of the capacity for its admiration, must be to strengthen the moral faculties. Thus the results of art-education will be both to put a tongue into our fingers by which we may express form, and cause a recoil on our minds which must generate thought and inquiry.

The means for all this are as yet necessarily experimental. It has been found that the schools of art and design have not attained the object in view: it becomes, therefore, a question as to what means are to be adopted for its attainment, and under what circumstances. The trained and educated master of art (in its truest and not its conventional sense) is regarded as the most fitting person to achieve the looked-for result, and upon his shoulder is placed the *onus* of the task. This is natural. But when a man has spent the best years of his life in mastering a difficult profession, often at great sacrifice of other prospects, and finds himself possessed of so subtle a weapon as art-power, he rationally looks for some return for his long labours, as well as a recognition of his professional position. To labour patiently in the mission of art-education is his expected task, but to do so without adequate remuneration he has not looked forward to. Here a difficulty presents itself. Our means of extending art influence to the lower classes are through the ordinary parochial schools; and such schools are not in a position to pay professional prices. How then are the masses of the people to be reached? The majority of our country towns are not able even to—or, at least, will not—support a school of art, which is the recognised focus from which art-teaching must radiate; and, without this, how are we to make art-education general? To meet these difficulties, it is evident that at first we must couple the general education in art of the people with the special art-education of particular persons, in order to create remunerative positions for those who have the non-remunerative task of the instruction of the people; and, inasmuch as art-power is socially and commercially a great good, we must not be too chary, at first, of making such positions remunerative by Government assistance. The man who has been severely trained in the Government's own school, at some expense both to himself and his country, must be made the means of this good to his fellow-countrymen; but, like other men in similar positions, he must be paid for it; and, if we are to expect able, efficient, and intelligent men, they must be paid equivalently to their professional position.

So much may be said for the future masters of schools of art; but, in all justice, let us look at both sides of the question.

It is a mistaken notion to suppose that the certificated art-master is to be the perpetual teacher of drawing in parochial schools. From the fact of its being impossible as a permanent business speculation, we may decide it is not to be the case; and it is his own fault, and worse than his fault, if he does not make it a means to an end, and not the end itself. In a country town where a school of art may be established, he must be the teacher of such schools for a time, because there is probably no one else besides himself who will teach it as systematically and well as himself. But, as he progresses, he will raise the means of shifting this arduous duty from his own shoulders to those of others, who together will be better able to discharge it.

And in this manner the schoolmasters and pupil-teachers in every national school, in or near the town, should be compelled, as a part of their work, to attend a class for their special education at the school of art. The fact of teaching drawing in their schools increasing the salaries of the schoolmasters to the extent of 8*l.* for each school taught, will help to impress upon them the advantage of the power; but at any sacrifice they must be made to learn drawing, in order that they may teach it. They are the fittest persons to teach it to young children; because, from experience, they are well able to impart instruction, and have the greatest power over their pupils: and as for the most part they are well educated and intelligent men, the task of acquiring the power of drawing will be comparatively easy to them.

Thus, then, in time, will the art-teacher raise up to himself the disciples who will help him in his mission. But in the interval, whilst he is labouring for a common good, he should not be made a sacrifice, which would be a most suicidal proceeding, inasmuch as it would certainly result in thinning the ranks of the best men, by giving them fair cause for desertion to a more grateful field of enterprise.*

Let each man who is sent out to a provincial town be paid liberally, according to his standing, from the annual Government grant to science and art; and let this continue for a limited period, say one or two years, as the case may be. At the end of that time he ought to have made himself a position, independent of the greater part of State assistance, and should then be made the local inspector of art-teaching in the neighbourhood; for by this time we have supposed that the work, in parochial or non-remunerative schools, has been undertaken by his own pupils: he then has to see that his machinery works well, and keeps in good order, and also to attend to his central school of art. By this means we might spread art-education over a larger surface than our present system does; for, amongst the schoolmasters taught to draw, should be included those within a moderate distance of each town, and whose schools might be periodically inspected by the local inspector. Surely among other experiments this might be fairly tried in cases which would fathom its advantages.

* Not an uncommon case even now.

THE FUNCTIONS OF THE SCIENCE AND ART DEPARTMENT.

A SERIES of lectures on the Department of Art and the Museum at Brompton was commenced on Monday evening last, in the new theatre there: the lecturer was Mr. Henry Cole, C.B., and the subject the Functions of the Department. It was an interesting statement, and will be made generally accessible by being published for one penny. We would gladly print a considerable portion of it, but are forced by the multiplicity of matters which press upon us to confine ourselves to two or three paragraphs.

Of the state contributions for promoting public education, Mr. Cole said,—

"The total national expenditure for promoting Public Education and Science and Art in every way through the primary division of the Education Board, the British Museum, National Gallery, grants to Universities, and grant to this Department, may be taken, at the present time, to be in round numbers a million of pounds sterling, which divided among our population, say, of 30,000,000, makes the contribution of each to average ninepence per head per annum. It is difficult to calculate the annual value of the production of this country; but I think, seeing that our imports and exports last year amounted to 288,545,680*l.* it is not an over-estimate to place it as being worth 400,000,000*l.* a year. The state contribution towards Education, Science, and Art, which vitally influences this enormous amount, therefore, bears the proportion of the outlay of one pound on behalf of Education, Science, and Art for every 400*l.* of production, or one penny in every 1*l.* 13*s.* 4*d.* The annual Parliamentary vote for the Science and Art Department only, being under 75,000*l.* is less than a five-thousandth part of the estimated annual production, and is about a thousandth part of the annual taxation of the country. It is as if a man with 1,000*l.* a year devoted 2*l.* 6*s.* 3*d.* a year to the general education of his children, and gave them the additional advantages of drawing-lessons and a little navigation, at a cost to himself of 3*s.* 9*d.* a year. In the same proportion the agricultural labourer, who earns only 25*l.* a year, devotes 1*s.* 3*d.* to the education of his family, and has to deny himself the luxury of half a pint of beer in a year in helping his children to a knowledge of drawing, and enabling them to cut and rule straight lines.

It may be pointed out as a coincidence at least worthy to be remembered by any who oppose State aid towards education, that whilst democratic power in this country has increased, so a demand upon the Government to exercise certain new functions has increased also. As the people have felt their wants, and have had power to express them in Parliament, so the central authority has been called upon to administer to these wants, and it is the Government itself rather than the people which has endeavoured to obtain and preserve as much local co-operation as possible. This has been the case especially with the subjects of public education, in which, so far as I have observed, it is the complaint of localities, and particularly where the jealousy of local authority is hottest, that the Government does not do enough for them. The Education Boards in England and Ireland, the Schools of Design, and the greater number of the grants for promoting Science and Art, have all arisen since the passing of the Reform Bill in 1830. It was rather the influence of the Crown that created the Royal Academy in 1768 than any public demand. And so feeble was the expression of public opinion through the Commons' representatives in 1810 on the subject of Public Galleries, even if it existed at all, that the then Chancellor of the Exchequer is said to have refused to accept the Dulwich Gallery of Pictures as a gift to the nation, on the condition of housing and taking care of the Pictures. Last year the Government, through Lord Stanley of Alderley as President of the Board of Trade, built a structure on their own responsibility to secure Mr. Sheepshanks' munificent gift of pictures, valued at 60,000*l.* and Parliament afterwards cheerfully voted a sum under 5,000*l.* requisite for its cost. In half a century such has been the change of public opinion in respect of National Galleries of Pictures."

"The number of Navigation or Science schools of all kinds at the present time in connection with the Department is twenty-two. The number of Schools of Art throughout the United Kingdom at the present time is sixty-five; and, according to the last returns, they were the means of educating upwards of 35,000 students in drawing and painting. These numbers include children in poor schools under instruction in drawing. Since the Schools of Design were expanded into Schools of Art, and made to embrace the teaching of drawing in public schools, the progress has been as follows:—In 1851, 3,296 students learning drawing cost the State 3*l.* 2*s.* 4*d.* each. In 1856, 35,000 students cost the State about 15*s.* each, as nearly as can be estimated. But this number is really insignificant, being a trifle more than 1 in 1,000 of the population, and it is disheartening to feel that, according to the present state of public feeling for Art, perhaps half a century must elapse before every mechanic will have had the means in his youth of acquiring those elementary principles of Art which would improve the daily work of his future life."

Speaking of the contents of the Museum, he said that many of the things exhibited had been either altogether hidden previously, or inadequately exhibited:—

"The architectural collections belonging to the Department for years were buried in the cellars of Somerset House, and were but most imperfectly shown at Marlborough House. The prints and drawings possessed by the Department have never been seen by the general public. The casts of the Architectural Museum are surely better displayed than in Canon-row. The union of these collections, and the addition of the models of St. Paul's and various classical buildings, betoken what an Architectural Museum may become, if the individuals and the State will act together. Every foreigner who has seen this commencement sees in it the germ of the finest Architectural Museum in Europe, if the public support the attempt."

And he added, "The iron Museum is only to be regarded as a temporary refuge for the destitute."

CANNING TOWN AND HALLSVILLE, WEST HAM.

THE recent outbreak of cholera in this neighbourhood has led to further efforts on the part of some of the clergy and more influential inhabitants to obtain improvements in the drainage of the place, and such other mitigations of its miserable condition as may render the development of disease less likely. At the commencement of the year a petition had been forwarded to the Secretary of State for the Home Department, setting forth,—

"That the houses in the district have, for the most part, been built without any regard to the health or comfort of the inhabitants.

That the district is a marsh 7 feet below high-water mark, the tide of the Thames being only kept out by the river-wall. It is wholly undrained, and intersected with overflowing and pestilential ditches, which are the only outlet for all the sewage and filth of the neighbourhood.

That the health of the neighbourhood has already suffered much from the neglect of proper precautions, the proportion of deaths to the population being frightfully large."

And earnestly praying,—

"That *immediate* and independent measures be adopted to carry off the sewage from their houses, and the stagnant water which accumulates on the surface of the soil."

There was a correspondence in consequence between the General Board of Health (to whom Sir George Grey referred the petition), and the West Ham Local Board of Health, but nothing was done.

A few weeks ago the cholera appeared in the parish, and carried off several of the inhabitants. The gentlemen who had moved before—the Rev. Mr. Marsh, the Rev. Mr. Mason, and Mr. Antonio Brady—immediately addressed the Board of Health again, and said, in the course of their communication;—

"Public attention has been lately called by your Board to the near approach of cholera. At least seven fatal cases have already occurred in this parish, and a heavy responsibility attaches to those who have neglected the warnings of experience, and allowed the present state of Hallsville to continue. It is not for us to suggest remedial measures, but we would, nevertheless, most earnestly entreat you at once to send an inspector (unconnected with the neighbourhood) to report upon the sanitary state of West Ham, and especially that part of it lying in the Plaistow marshes."

They further urged that the inspector should instruct the Local Board as to the precautionary measures necessary now to be taken, and they suggested that advantages would follow "if the provisions of the Metropolitan Building Act were extended to West Ham." This was on the 16th ult. The President of the Board, the Right Hon. Mr. Cowper, went down immediately, and found houses without drainage, without ventilation, without water-supply, except of the worst description, ditches presenting an evaporating surface of the foulest kind, and the roads a mass of mud and filth; the whole being a marsh 7 feet below high-water mark. In Vicarage-terrace the only drain available is a sink *under the pump, into which they habitually empty all the slops of their houses!* The sink communicates with the well, and the people have no other water to drink! The Board have addressed the Local Board of Health, calling upon them to take "immediate and effective measures for removing, or at least for mitigating, conditions so conducive to the development of the disease, under which most of the inhabitants of their districts are placed." At any cost, something should be done immediately.

We are not now approaching this place for the first time. Nearly two years ago we described the imminently dangerous position of Canning-town, and in our fourteenth volume (p. 99), gave a sketch, showing that "the artificial bank of Bow-creek, and the embankment of the Thames, are all that prevent the houses here from being flooded every high tide." We pointed out that it was impossible to provide for the drainage of the place by the ordinary means, and said,—"The houses here have been erected without the means of either carrying off the refuse or properly getting rid of the damp. In the course of time the *débris* of these and other houses will raise the level; but it is sad to think of the sacrifice of human life which must take place in the mean time without prompt measures." Again,—"If something is not done, in two or three years the ground will be poisoned by cesspools, water will stand on the surface, and evils of a serions nature will follow." "Let us hope for the introduction of measures proportionate to the extent of the future requirements. Flesh and blood are precious materials."

The measures were not taken, and the evils have become more apparent: again, therefore, we call for remedial measures. The erection of dwelling-places in such a position should not be permitted. Being here, their owners must do what can be done to save life. Flesh and blood, as we before said, *are* precious materials, and the country cannot afford to indulge in preventible disease, involuntary demoralization, and premature deaths.

MEMOIR OF LOUIS VON ZANTH, ARCHITECT.*

THE death of a distinguished brother architect, and more particularly of one who has been a corresponding member of our body and a liberal contributor to our collection, demands some notice on our part. I feel it, therefore, to be a duty which devolves on me as your secretary of foreign correspondence, to seize as early an opportunity as possible to pay that respect to the memory of our departed colleague, Herr Zanth, who has by his works well merited a page in the history of our art.

I have reason to believe that he was born about 1798, at Breslau, in Silesia, and was consequently a Prussian subject. His father was an eminent medical man, and chief physician to Jerome Buonaparte during the residence of that sovereign at Cassel. Louis was educated partly at Cassel and partly at Paris, and, it is supposed, was a pupil at the Lycée Napoléon. Having evinced a decided taste for drawing, he was placed at Stuttgard, where his widowed mother resided, under the architect Fischer, professor of the Polytechnic School in that town. About 1819, Zanth went to Paris, and became the pupil of Monsieur Hittorff, and although he had then made little progress in composition, he showed an evident bias for decorative detail and great purity of drawing. He followed his excellent master's advice, and took part in the competitions of the School of Architecture; but being of a reflective and deliberative turn of mind, which cannot at a given moment command the imagination, and hence under such a pressure becomes faltering and undecided, he was never able to improvise with sufficient rapidity, and could not accustom himself to the excitement, bustle, and clamour to which the impressionable youth of our neighbours yield when engaged in such exercises. This circumstance affected his conceptions, and although his "projets" were drawn out with the most elaborate care, he never could carry off a medal. But when left to himself, and to the quiet of his own leisure and reflection, his designs were

* Read by Professor Donaldson, at the meeting of the Institute of Architects, on the 16th, as mentioned elsewhere.

admirable, and evinced considerable originality and careful treatment.

Zanth from the pupil became the assistant of his friend and master, and in 1823 both went to Sicily, with the view to investigate fully and thoroughly the antiquities of that island, which as yet have never been adequately illustrated, numerous and costly as are the works, and learned as are the authors, treating upon its ruins. During their stay, Messrs. Hittorff and Zanth were struck by the beauty of the numerous buildings erected since the Greek times, and which adorn the cities of Messina, Catania, Palermo, and other places, erected by the different conquerors of the island, since it was in the possession of the Romans. They, therefore, took accurate drawings of the churches, palaces, monasteries, hospitals, public fountains, private houses, as also details of altars, tombs, pulpits, stalls, and other decorative embellishments in the churches, which are marked by a happy freedom of design, novelty, and effective combination. The work, which appeared in the joint names of the authors, was specially edited by Mons. Hittorff, in numbers, between the years 1826-35. The choice of subjects is extremely varied, containing examples of Moresque, Saracenic, and Byzantine, as those of Palermo and Mon Reale, and embracing every period of modern architecture without an exclusive adherence to any. The execution of the work is in outline, and may be cited for the judicious selection of the subjects, the purity of the drawing, and exquisite character of the engravings.

At the same time appeared many numbers of their work on the ancient monuments. It is to be regretted that this valuable publication has been suspended from the want of particulars to complete their previous studies, which a personal visit to Sicily can alone satisfactorily supply. It is to be hoped that the survivor may accomplish what still remains a desideratum—a work on Siculo-Grecian architecture, rendered complete by the light of modern researches, and the experience and learning which have, of late years, been brought to bear on works of this class, and for the elucidation of which no one has proved himself more competent than Monsieur Hittorff.

Zanth was especially struck by the peculiar magnificence of Mon Reale, and the Eastern aspect of the Capella Reale and of the palaces of La Zisa and La Cuba, at Palermo, of which he subsequently made some splendid and elaborate coloured views to a large size; and in fact this style of art seems to have had a decided influence on his future artistic taste. In 1830 Zanth quitted Paris to seek a new sphere of employment, and returned to Stuttgard, where he constructed many charming town and country houses, perfectly adapted to the convenience of the occupants, elegant in detail, picturesque in their masses. These erections, and some of his beautiful drawings, were brought under the notice of the king, who immediately appointed him as his architect, and commissioned him to make drawings for a theatre to be attached to the palace; but which, unfortunately, was never executed.

His royal patron was desirous to form for himself a kind of special personal retreat, or suburban villa, to which he might occasionally retire for the day, or a few hours, like those of the papal families in the neighbourhood of Rome, as the Villa Papa Giulio, or those at Frascati and Tivoli, or as is found in various parts of Germany; or "*magna componere parvis*," like that at Chiswick, belonging to the Duke of Devonshire. It was to consist of a principal casino, hot-houses, and conservatories; porticoes, kiosks, a belvedere, ball-room, theatre, and domestic offices, connected one with the other by the general distribution of the garden, which was to be adorned with parterres, pieces of water, and fountains. The Wilhelma is situated at the extremity of the royal park of Rosenstein, at a league from Stuttgard, and near the town of Cannstadt, famous for its mineral waters, and the gardens extend down to the Necker. The style selected by his sovereign was the Moresque. The plot of ground appropriated to the Wilhelma lies on a hanging level, rising from the Necker; and Zanth found great difficulty in combining its various parts with the grounds of Rosenstein, which had been laid out by an ignorant gardener, without any reference to the undulations of the surface. In order to make himself acquainted with the most celebrated hot-houses in England, he came to this country, and visited those of Chatsworth and others, and also studied the application of iron to the various purposes of the forcing-houses, as also its fitness for the arcades, cupolas, kiosks, and columns of the porticoes.

On the occasion of this visit he exhibited his magnificent series of Sicilian drawings in these rooms, and was elected an honorary and corresponding member of our body. The studies of the Wilhelma were commenced about 1838: it was the favourite theme of his future existence, the one great object upon which he employed the remaining years of his life. His time, his health, his talents, and his means were all devoted to it: it absorbed all his thoughts and aspirations: he seemed to live for it alone, with a chivalrous love for his art. I have said that the king selected the Moresque style for the architecture of his villa; a style which has not in our days been adopted for an architectural monument of any importance. With the exception of the edifice called the mosque, in the Schwetzingen gardens, near Manheim, no serious attempt has been made to reconcile the forms, combinations, and decorations suited for one climate, so as to be adapted for another essentially different. The volume of Owen Jones was the only authentic reference for such a style; but of course it is evident, with even this admirable illustration of Moorish work in the Alhambra, that much must be left to the imagination, the taste, and the discretion of the architect, to harmonize the fantastic poetry of the style, its brilliant decorations, and its piquant individuality, with the ordinary wants and conveniences of modern European life. Our friend did not fetter himself by a slavish adherence to precedent, nor neglect any means of success; and he employed stone of various colours from the adjoining quarries for the principal buildings, rich coloured brick for the offices, and cast iron for various details. The Wilhelma presents a conscientious mastery of difficulties, and the triumph of the architect was assured when the most renowned sovereigns of Europe, attended by their numerous brilliant suites, found themselves in the casino, the conservatories, gardens, and porticoes, brilliantly illuminated, and reflecting the exquisite decorations, which, harmoniously distributed throughout, charmed the eye and satisfied the taste. And although the magician who had created the fairy scene was not there, his master spirit delighted the brilliant circle assembled in this truly royal villa.

Zanth has published ten chromolithographic illustrations of Wilhelma, drawn with the most elaborate patience, truly German; and they were executed by the most eminent lithographers in Berlin and Paris. He spared no expense to insure the most brillliant result, and one of the plates, the general view, required twenty stones. The French government, with a liberality that does honour to its love and patronage of art, subscribed for forty copies: it were to be wished that our own government felt more alive to the expediency of encouraging in a like manner publications of this class. He presented a copy of this costly work to our library.

A wealthy landed proprietor in Hungary sent for him to make the plans for a large village, with houses and farms of different sizes, a church, and other public buildings, in connection with the restored castle of the lord. These designs are of the greatest interest; for he scrupulously studied to make them conform to the materials at command, brick and wood, which were alone procurable in the country; and he gave them a national character, elevated by elegant and appropriate combinations and proportions, without departing from simplicity and utility.

Zanth's health had of late years yielded to the unremitting toil with which he followed his art; and, absolute rest being necessary, he last year visited Italy with Mons. Hittorff and family. His anxious friends had hoped that he might have enjoyed an elegant repose amidst such scenes without the fatigue of thought, and that the fire of his genius might have been rekindled by the renewed contemplation of the noble works of that classic soil. But the tone of his early energy was gone; the languid invalid looked without emotion at those monuments which he had once regarded with the liveliest enthusiasm, and his residence of some months at Rome was one of suffering and discomfort. While there he received instructions from his king to design a Protestant church, to be attached to the royal palace. This he completed, not without great effort, after the Basilica type, and, on his return in June last, presented it to the king, who approved of the conception, and the church was decided to be carried out as designed by him, and to be commenced early in 1858. He had also completed some time since the drawings for a Roman Catholic church, which it was recently intended to erect after the concordat entered into between the King of Wurtemburg and the Pope.

The death of this distinguished architect occurred on the 7th of October last, and was attended by circumstances which may remind us of the hero cut off on the field of battle, or the chaplet-wreath bound round the head of the expiring victor in the Olympic games. The Emperors of Russia and of the French met as guests at the court of the King of Wurtemburg, and this prince, wishing to do all honour to the sovereigns, gave a splendid fête in the rural palace of the Wilhelma. The monarchs, surprised and delighted with the magnificence and taste of the fairy scene by which they were surrounded, and by a style of art recalling the fabled and gorgeous scenes of the Eastern caliphs, rather than the court of a German king, eagerly inquired to whose skill and imagination their host was indebted for the exquisite and varied architecture around them. They learned that it was Herr Zanth, and that he lay at that moment on his bed of sickness. The Emperor of Russia, anxious to express his satisfaction to the artist, sent Prince Gortschakoff at once to the bed-side of poor Zanth, to present him with the decoration of Commander of the Order of Stanislaus, and the prince himself attached to the breast of the sick artist the ribbon and cross of the order, accompanying the act with the gracious and touching expressions of admiration which the emperor had uttered. Zanth was on his death-bed, but this act of kind consideration soothed the last moments of one whose devotion to his art and amiable disposition had endeared him to all who knew him.

Zanth was an enthusiastic follower of architecture; his predilections were for classic art. He was unrivalled as a draughtsman for the minute accuracy of every part and the finish of every detail. His large perspective drawings were the most scrupulous possible renderings of the buildings they represented; and although they might want somewhat of aërial effect, yet they were always strikingly effective and grandly rendered. He was extremely susceptible in his feelings, and shrinking from observation. In disposition he was most generous, ever ready to acknowledge talent in others, and most firm in his attachment as a friend.

"No man is a prophet in his own country," and it is to be feared that the noble, upright, and highly-gifted architect of the Wilhelma was not as fully appreciated by those immediately near him, as he was by the sovereigns of other states, and by his professional brethren in other countries, who honoured him as an artist and esteemed him as a man. He had received the Cross of St. Gregory the Great from the Pope; that of the Lion of Zahringen from the Great Duke of Baden; that of St. Louis from the Duchess Regent of Parma; and he was member of the academies of Berlin, Munich, Milan, &c.

These few notes consist of the impressions produced by an intimate friendship and intercourse of five-and-twenty years; but I am indebted for many particulars to our mutual friend Monsieur Hittorff, who was to him as a brother, not merely in art, but in affection. Zanth was limited in his friendships; his modest and retiring nature made him instinctively avoid numerous attachments; but the few who knew him appreciated the rare moral and intellectual qualities, which made them share in the triumph of his successes, and lament him as one whose loss it is not easy to replace.

THE GREAT BELL AT WESTMINSTER.

Few people give anything so liberally as advice, especially in matters which really do not concern them; there being a secret pleasure in imagining they possess more discrimination than the rest of the world. It is now nearly two years since I offered some remarks on the forms, methods of casting, and ringing of large bells, with suggestions on the subject. I stated that in proportion as the bell is increased in size and weight, so is it less likely to be sound and free from the chances of being easily cracked. If the bell is to be a large one, the metal must be fused at several furnaces, varying in intensity of heat, and some ready for the mould before others; but whenever two or more currents of fluid metal meet, the rudiment of a fracture may be formed, as the chances are that different meltings may vary in temperature, and one will solidify before the other; also that portions of oxide or earthy matter, floating on the surface, may prevent the perfect junction and incorporation of the two streams.

Bells are usually struck by a clapper within, or by a hammer on the outside. Such continued battering upon a large hollow, cast or crystalline substance, perhaps in the first instance not perfectly sound, must, sooner or later, certainly crack the metal. This may happen when the bell is quite new, or it may be used for several centuries before the fracture is observed. A number of comparatively insignificant hammerings or concussions will produce a very surprising effect if continued for a long period. The fracture may, at first, be so trifling as to be almost inappreciable by the most refined ear; but every stroke of the hammer will increase the evil, until the vibrations of the metal are so interrupted, that instead of a long-continued harmonious sound, an unpleasant jarring noise is produced, and the bell becomes useless.

Now that the bell at Westminster is broken, we can readily understand the cause, for we are told by Mr. Denison * that it was knocked sometimes within, and frequently on the outside, with a clapper or a hammer, from two to three times as heavy in proportion to the bell as any of the other large bells in England, and pulled sometimes by as many as *ten* men. The reason assigned for this difference in the

* Proceedings of the Royal Institution, March 6th, 1857, Pp. 2 and 11.

size of the clapper is, that the bell had a much greater power of bearing blows than usual. Suppose, for example, it was required to break a large bell: the mode of procedure would be to strike it with violent and repeated blows from a heavy hammer, till the operation was ultimately successful: then why not expect the same termination in all cases, if the same process be adopted?

The general *tone* of the learned gentleman, whose name appears so conspicuously embossed on "Big Ben," is to the effect, that he knows more about bells than any one else: this is certainly the substance of his two hours' discourse, delivered, before the bell was cast, at the Royal Institute of British Architects, on the 28th of January, 1856. When the bell was completed, Mr. Denison described it to a very numerous audience, at the Royal Institution in Albemarle-street, on Friday, the 6th of last March, in terms which induced us to believe that he was, in every respect, satisfied with it; that the whole proceeding had terminated precisely as he expected; and, in fact, we were given to understand, that it was the only good bell in the world. Whether this was the case or not, it is immaterial now to inquire: all hopes of that one good bell are ended: it is useless, spoilt for ever, before it had been placed in its final destination; but not before it had been delivered, highly approved of, and paid for out of the public exchequer.

I do not agree with the adage, that "experience makes all folks wise:" some people cannot see folly which is evident to the rest of the world. But I readily admit, that "experience makes wise men wiser:" the greatest philosophers sometimes overshoot themselves; but their mistakes may prove valuable lessons of instruction to those who know how to benefit by them. For this reason, we must sincerely hope that Mr. Denison has learned, by experience in bell-metal, that the old shape, and the old method of manufacturing unusually large bells, is unlimited as to expense, quite uncertain as to the result; and, if ever so successful at first, that they may terminate at any indefinite period: therefore, as the nation has just been at the expense of several thousand pounds, in the expectation of having a good and durable bell, it may not be amiss to remind him that failures, similar to that which has already happened to the Westminster bell, will, in all human probability, occur again and again, if the same form, the same weight of metal, and the same circumstances, generally, be repeated.

Mr. Denison told us, at the Royal Institution, that when HE undertook the responsibility of determining the size and shape and composition of the five bells, the Chief Commissioner of Works authorized the making of such experiments as might be required, before finally determining the design and composition of the bells;—and, further, that these experiments cost about 100*l*. The great bell can now only be considered as one unsuccessful experiment, causing a loss to the nation, and we are still ignorant of any certain or successful termination: the metal may be recast several times, with the same result; because, in recasting a mixture of copper and tin, weighing sixteen tons, there are difficulties to contend with, little known to any but a bell-founder, or metallurgical chemist; and the expense may not stop at "Big Ben;" for, every time he is melted and cast, he will, probably, come out of the mould with a different voice, which may not chime in harmoniously with his little companions; and as it is much easier to alter four little bells than one large one, it is extremely probable that they will all have to be recast, to try and make them correspond in sound with their stentorian neighbour. This is by no means an imaginary incident: the present large bell was intended to sound E flat; whereas, by some unaccountable mismanagement, it turned out to be E natural. The next experiment may prove to be E sharp.

Before the public is called upon to pay for casting another "Big Ben," which may again end in vexatious disappointment, it is to be hoped that the entire subject will be thoroughly investigated, and certain well-considered experiments, upon a large scale, be undertaken, for the purpose of suggesting some modification of the old ponderous bell, which may answer every purpose intended, during the period of at least a century, with a grand-sounding, dignified tone; and, if a satisfactory tone can be heard, with full effect, in St. James's-park, or at Lambeth-palace, is it of such vital importance that it should be heard distinctly in Hyde-park, or the Regent's-park? The outline of research, or class of subjects for experiment, should not be under the entire direction of mere amateurs, however learned they may be on other subjects. There can be no objection to one or two well-informed amateurs, who possess a good share of common sense, joining a committee formed of two or three gentlemen eminently distinguished for their attainments in physical science; and certainly there should be added one or two practical bell-founders, or clever mechanics. A party, thus constituted, might be led into a train of ideas and experiments as yet but imperfectly developed.*

All persons in a civilized state of society are unanimous in their admiration of classical learning and collegiate studies: such acquirements generally give those who possess them almost unbounded advantages over others who are less learned; but the love of precedent, and the desire of following in the popular current, have frequently induced such persons to adopt notions contrary to the plainest dictates of reason and common sense; and, consequently, the most inconsistent schemes have been admitted without scrutiny, and applied without reflection. The steam-engine, the railway, and the electric telegraph were invented and matured by men unknown to the universities but very far in advance of ignorance. They were self-taught: all the most learned men are, without exception, self-taught; for, if they are more learned in any department of art or science than the rest of mankind, of course no one can teach them: they advance by their own studious habits, and perhaps, unshackled by scholastic authority, boldly venture upon untrodden regions of science to make discoveries of great public utility, whilst their more learned contemporaries are fearful of risking their reputation in pursuit of what may be deemed wild and visionary theories: therefore

> "Give to the dictates of the learn'd respect,
> Nor proudly untaught sentiments reject."

C. H. SMITH.

* The accident to "Big Ben" is now attributed to the fact that it was cast 5½ inches thick in the waist, instead of 4½ inches, as prescribed.—ED.

FIR, DEAL, AND HOUSE PAINTING.

AN ATTEMPT TO DETERMINE THE PERIODS IN ENGLAND WHEN THESE WERE FIRST INTRODUCED, WITH REMARKS ON THE PROCESSES OF THE LATTER.†

IN every branch of painting in oil applicable to buildings, the general process will be found very similar, with the exception of such variations as easily suggest themselves to the careful workman. The first essential is, that the wood plaster or cement should be perfectly dry. This is acknowledged by all, and yet when despatch is the order of the day, it must be neglected. One writer goes to the extent of stating, that "Perhaps in general cases, where persons are building on their own estates or for themselves, two or three *years* are not too long to suffer the stucco to remain unpainted; though now frequently in speculative works as many weeks are scarcely allowed." The wood-work having been prepared for fixing, has first to undergo the operation of "knotting," in order to prevent the turpentine in the knots of fir-wood, from passing through the several coats of paint. One method for best work is to cut out the knot whilst the work is at the bench, to a slight depth, and to fill up the hole with a stiff putty made of white lead, japan, and turpentine. There are many ways of "killing" the knots. The best and surest is to cover them with gold or silver leaf. Sometimes a lump of fresh-slaked lime is laid on for about twenty-four hours, then scraped off, a coating of size knotting applied, and if not sufficiently killed, they are coated with red and white lead in linseed oil, and rubbed down when quite dry. The general method is to cover the parts with the "size knotting," *i. e.* a preparation of red lead, white lead, and whitening, made into a thin paste with size. The most common mode is to paint them with red ochre, which is worth nothing. The next process is that of *priming*, which consists in giving a coat of white lead with red lead, and a little drier in linseed oil. This is the first coat, and upon which the look of the paint on completion depends. This first, or priming coat, is put on before "stopping" the work, should that process be required. It consists of filling up with putty any cracks or other imperfections on the surface of the wood. If the putty used in the process of stopping be introduced before the first coat of colour is laid on, it becomes loose when dry. A good painter, after the application of this first coat, removes by pumicing all irregularities from the surface, especially those rendered apparent by the knots and fibres of the wood. A smooth surface being thus obtained, a second coat is given, consisting of white lead and oil: about one-fourth part of turpentine is sometimes added for quick work. If four coats are to be put on, this second one has sometimes a proportion of red lead, amounting to a flesh colour; but if only three, it is generally made to assume the tint of the finishing coat. It should have a good body and be laid even. This coat, when thoroughly dry and hard, is in best work rubbed down with fine sand paper, and carefully examined to ascertain whether any further stopping be required; and then the third coat, or "ground colour" applied, of a somewhat darker tint than wanted when finished, having sufficient oil for easy working, but not too fluid: thus, two-thirds oil and one-third turpentine are employed; or sometimes in equal proportions of oil and turpentine. The *flatting* coat follows, the object of which is to prevent the gloss or glaze of the oil, and to obtain a flat dead appearance. The advantage is not confined to the look of the paint, for it hides all defects in the wood or other material that is painted. White lead is mixed with turpentine, to which a little copal varnish is sometimes added, and when the tint is put in, it is always made lighter than the ground colour, or it would, when finished, appear in a series of shades and stripes. Flatting must be executed quickly, and the brush is generally, if not always, carried up the wall and not across it. It must be understood that a flatting coat is not considered as a coat of paint: being wholly of turpentine, it is by exposure to the air evaporated, leaving a thin coat of pigment which is only required for effect, not for use. Some painters, particularly where the work is required to dry rapidly, use a large proportion of turpentine in the several coats; thus the ground coat has two-thirds oil and one-third turpentine. If four coats are to be laid on, the third has a little more turpentine than usual, which in the second is about a quarter, and so on. I would suggest for particular attention, that *turpentine*, on the whole, is chiefly useful for the purpose of saving oil and labour. It should never be employed where really lasting work is required. The necessity of having the substance perfectly dry before it is painted has already been noticed, and it is equally important that each coat of paint should be quite hard before another is applied, more especially where the work is exposed to the sun. When the material is quite dry, the first coat is readily absorbed by the wood or plaster. Plaster to be painted requires some additional care in the workmanship itself: unless it be quite good, the lime works out in minute bubbles and destroys the effect of the paint, which can only be corrected by rubbing down and repainting; even then with no great certainty of success. Some persons advocate the use of a priming or of a second coat, made of strong double size, stained with some colour to mark where the brush goes. The second coat then consists of white lead in all oil, used as stiff as possible: the third coat is made of single size with a little white lead ground in water to mark the course of the brush; and the fourth coat of white lead in two-thirds oil and one-third turpentine, with a little blue-back to take off the rawness of the white. Such work as this is now generally repudiated: those in its favour state that it is of equal benefit with a coat of paint for inside, but confess that it is not so for outside work. Its objectors state that such "sheepskin" coats prevent the paint from sinking into the wood or plaster, causing the paint to peel off and chip: I fear that it is much practised in inferior work. When inside work has to be finished of any colour, it becomes necessary to provide for it at the third or second operation, according to the number of coats; particularly if the work is to be finished flat, or as it is termed, dead white, grey, &c. All new *outside work* should be primed a flesh colour, mixed in all linseed oil. The second coat may be of the same mixture if four-coat work is to be done; and in this coat all defects are to be made good. If three coats only are to be applied, this one should be laid on with care. The third and fourth coats, whichever may be determined upon, are generally white, stone colour, lead colour, chocolate, olive, and invisible green, all in linseed oil. When white lead is employed alone, it has been recommended to dilute it with half drying or boiled oil, and half linseed oil, as the boiled oil affects the colour of the white lead a little, but in all other colours boiled oil may be considered the best for the purpose of preservation. When it is required to cover a painted material, or "to repaint," the surface must be prepared to receive the coats of paint: it is sometimes first washed, or if the work be very greasy, turpentine is used, after which the paint is rubbed down with pumice-stone and water, or with some potash in it, until an even surface is obtained, removing any knobs or imperfections in the previous coatings. In repainting, the first coat is called "second" colouring, the old work being considered equal to a primed state. It is composed of white lead, turpentine, and oil, with the pigment required for the colour that may be wanted. Some painters use two-thirds turpentine and one-third oil; others three-fourths turpentine and one-fourth oil; and even all turpentine, drier, and a very little red lead; but this last must be worked very quick, crossed once, and laid with the grain of the wood, as it is not much better than a flatting coat. For third colouring or finish, the white lead is thinned with half turpentine and half linseed oil, drier, and a very little blue black, to take off the rawness of the white, and also to make it cover better. For the best rooms the flatting coat is required, as before described. Two coats of new paint are frequently sufficient for ordinary work where painted

† Read by Mr. Wyatt Papworth, at Institute of British Architects. See p. 654, *ante*. The date of Hardwick Hall should be 1570 instead of 1750.

previously. Light-coloured work, as margins, rails, and so on, is generally painted before the darker work, as mouldings, &c. Carved work especially requires care to prevent the work being clogged up.

Where the face of old work presents a very bad and uneven appearance from blisters or other causes, the inequalities are filled up with a cement. Modern specifications often require that the woodwork should have four or more coats, until the paint "bears out." This is certainly necessary when it may be anticipated that little oil will be used, or where the priming and early coats may not have been properly attended to. The result is a deadness in one part, the glaze continuing in another. It often happens, too, that the sun and air has quickly dispersed the greater part of the most valuable quality of the paint, *i.e.* its oil, and the work presents the same flatness. Care is also required when constantly painting in chocolate or black: if these are made too thin with boiled oil, blisters occur, which causes the paint to peel off, and leave the wood almost bare.

Painting plaster work demands a few observations. White lead and linseed oil, with some litharge as drier, are mixed to the consistence of thin cream, and applied; the oil is entirely absorbed into the plaster in a few hours. This coat will perhaps be sufficiently dry in a day or two, when another, a little thicker, is given, the oil of which is also wholly or only partially absorbed, according to the nature of the plaster. In a few days a third coat can be applied, made rather thick, and (according to the absorption of the oil from the second coat) one-fourth or less of turpentine is added, and likewise the pigments approaching to the tint required. Should the plaster be thoroughly saturated, the flatting or finishing coat is applied as before described. When very durable work is required, a fourth coat is put on, thinned with equal proportions of turpentine and oil, and then the flatting coat. If the plaster be not flatted, the last coat is made of two parts turpentine to one of oil. By thus painting, plaster is rendered incapable of absorption, and its surface becomes hardened by the oil to a depth of about an eighth of an inch, rendering it less brittle, and enabling the surface to be washed. To effect absorption quickly, painters sometimes give the plaster two or three coats of boiling linseed-oil, which are soon absorbed, and then give it the other coats of paint. The substance, generally, constituting nine-tenths of the body of paint, is carbonate of lead, commonly called white lead, the quality of which is therefore of the greatest importance to the durability of the work. White lead is said to improve by being kept for several years before use. Besides the three qualities manufactured, six or more chief modes of adulteration have been recorded: 1, by carbonate of lime, as chalk, whiting, &c.; 2, sulphate of lime, as gypsum, selenite, plaster of Paris; 3, carbonate of baryta; 4, sulphate of baryta; 5, pipe and other clays; and 6, starch, flour, &c. Fine whiting ground in oil is very difficult of detection: it not only renders the paint a much less compact body, but causes it to be more easily acted upon by the atmosphere; thus blanching it and destroying it by repeated washings. These adulterations will in some measure account for the great difference that exists in the prices of painters' work. The other metallic white paint now used is zinc white, well known for its intense whiteness, its resistance to sulphurous and other deteriorating causes, and its harmless qualities to the painter and the inmates of the house under decoration. It is requisite that the oil used should be as white as possible, all the brushes and pots well cleaned with spirits if they have been used before for white lead, and driers or colours with a lead basis should not be mixed with it. Zinc white possesses less body than white lead, and great care is requisite that the colour when ground in oil is of sufficient consistence to be laid on a flat surface without showing through; for in that state any oil in excess will form a slight glutinous coating on the surface, retaining every particle of dust brought in contact with it, until it has evaporated. In general this white will not dry so quickly as the older colour, but this defect is remedied by the application of proper drying oils. With these precautions a few trials will enable any painter who chooses to work zinc white to overcome the difficulties which appear at first to condemn the invention. It is asserted that in consequence of the great durability of the colour of this paint, a house painted with it may be washed for a succession of three, four, and even five years; and that after each successive washing, the surface will be found as clear and bright as when fresh painted.

Clearcole has already been referred to in conjunction with coats of oil paint. It is a cheap mode of painting, when used alone, for servants' rooms, kitchens, and such like places where despatch is necessary, or when it is necessary to paint often. The old work should be well cleaned and dried; and then a mixture of white lead, ground up in water and mixed with size, laid on: this will dry directly. For finishing, the white lead is mixed in half linseed oil and half turpentine, and used as stiff as possible: blue-black, or some colour, and a little drier, are requisite.

The use of distemper is older than that of oil and varnish. Whitewashing is a kind of distemper, especially when size is used with it. The extracts from the records in the former part of this paper have no doubt reference to this kind of painting, and the word "colour" would be more applicable as a translation than "paint," which is generally used. Common distemper colour for walls is Spanish white, or whiting, broken into water, to which is added strong size whilst warm, and then allowed to cool, when it should appear a thin jelly: two coats are generally necessary: when applied to old work, it should be first washed by a brush with water: this process in old publications is called "painting in water colours." Papered rooms coloured in this manner, especially if flock papers were used, look very well, as the pattern can be seen through the coats of colour. A convenience in the use of this preparation is that the rooms may be completed and dry in one day, with very little dirt or inconvenience. It is not generally known that walls which have been distempered cannot afterwards be lime-whited, in consequence of lime when laid on whiting becoming yellow. Oil colours, however, can be applied afterwards, and then white lead is used. Apartments that are to be varnished are prepared in two ways. The first is by applying the intended distemper colour, and then covering it with as many coats of coloured or uncoloured varnish as may be required. It may be useful to observe that distemper causes the wood to swell, and that if the material be not quite dry previous to the application of the varnish, the latter penetrates into the size, but is prevented from reaching the wood by the moisture retained in it, which opposes any union with the resins forming the base of the varnish. The varnish then gives to the distemper the hardness of cement, which, not yielding to the shrinking of the wood, scales off in drying. The second method is to grind and mix up the colour with varnish, which produces a better result, especially if the coating be applied when the wood-work is dry, and if it be very clear, so as to dispose the wood to imbibe it. The successive coats then become incorporated with the first. Generally but little colour is added to the last coat of varnish, and in some cases it may be applied colourless. It then forms glazing, and its brilliancy is greater; the colour also is stronger. The use of size produces a considerable saving of varnish, and the splendour given to this last stratum conceals the imperfections of an unequal coating of the colour. For new plaster-work a coat of size is requisite; a solution of glue in water, not too strong, is applied warm, that it may penetrate the plaster, which should be already quite dry. Additional effect may also be obtained by a careful pumicing after the first coat.

It is generally asserted that varnish is more liable to injury by dirt than oil painting, and that the means of repairing it cannot be the same, because the dirt adheres more strongly to the resinous parts of the varnish than to the oil surface. Soap and water applied carefully with a sponge, and the use of clean warm woollen cloths to dry the work, are efficacious means of cleaning both surfaces. The steps of wooden staircases which have been painted, grained, and varnished, wear better than those which have been only painted; the gloss is only very slightly injured by the operation of cleaning, and neither dust nor dirt adheres so easily. A coat of varnish can be again put on at any time.

The processes of graining and marbling may be traced back as far at least as the time of James VI. of Scotland (1567-1603), during whose reign a room of Hopetoun Tower was painted in imitation of marble. Before that period, imitations, as I have already mentioned, were done in stone-colour, marble-colour, wainscot-colour, &c. In 1676 marbling was executed, as well as imitations of olive and walnut woods; and in 1688 tortoise-shell was copied on battens and mouldings. The friend above referred to tells me that the doors of the chapel in Conduit-street, Bond-street, attracted much attention from the novelty of their being grained to imitate wainscot, done perhaps about the year 1810, when a new front was given to the building. From some letters in my possession I find that mahogany was imitated in 1815, and maple-wood in 1817. The imitating *marbles* and most kind of woods has nothing very peculiar in its mode of execution, being similar to actual painting, the result depending more on *natural taste* than on *mechanical skill*. The process of graining is in the first instance the same as for ordinary painted work, but it requires more care in obliterating the marks of the brush. The last coat, instead of being flatted, is composed of equal portions of oil and spirits of turpentine, and is brought up to the colour characteristic of the wood to be imitated. The shades and grain are given by thin glazings of Vandyke brown, burnt sienna, or umber, ground in water, and mixed with small beer, which is a sufficiently glutinous vehicle; but imitation wainscot requires a thicker one, in order to receive the impression of the combs by which the grain is imitated. Thus oak graining is executed with colour in turpentine mixed with a little turpentine varnish; the work being covered with it, the combing is done without delay as it dries very quickly. The lights are then taken out with a camel's hair brush, or a rag moistened with turpentine, and rubbed clean. In cheap work the operation ends here, and the surface is covered with copal varnish to protect it; but good work is "over grained," that is, a glaze of colour in beer, as dark as may be requisite, is laid over the combed work, in shades thrown across the work. Sometimes the whole panel is laid in with this glaze, and the lights taken out with a sponge, a brush is then used to lighten the edges; when quite dry the work is overgrained with the same colour laid on thin and softened off. For graining wainscot in oil, bees-wax is used instead of varnish to the colour, mixed in equal quantities of turpentine and oil; one, two, or three coats of a good oil varnish, such as copal, are applied when the work is quite dry.

Time only allows me to mention the use of staining and varnishing, and to refer slightly to the process of polishing wood by varnish and wax. Varnish and polish, both form a glazing, and give a lustre to the wood they cover, as well as heighten the colours of the wood, but from their want of consistence they yield to any shrinking and swelling, rising in scales or cracking when much knocked about, which damages can only be repaired by application to a proper workman. Waxing, on the contrary, resists percussion, but it does not possess in the same degree as varnish the property of giving lustre to the bodies on which it is applied; any accidents, however, happening to its polish are easily repaired by rubbing. As another method of covering a surface, the board now exhibited has been prepared to show how deal may be employed without the use of oil painting. The surface having been prepared, it was at once grained, the natural colour of the wood forming the ground of the imitation wood, the whole was then varnished as usual. In coarse deal, the knots might be worked into the pattern, but in wood selected for the purpose, the small knots could hardly be said to disfigure the work. Another advantage to be considered of material importance is, that as there is no oil painting required, the material would be drying up to the last minute of finishing the house, when the graining and varnishing would be done in a few days.

The proper time to paint is a subject worth consideration. For interior work it is not so important as it is for exterior; though for the former some part of the warm, not hot season, should be selected, not only to get rid of the smell more quickly, but because moderate heat improves the look of the work, while cold air chills the oil. For external work, the proper season is undoubtedly the autumn, when the days are sufficiently hot to dry the work properly, and the weather sufficiently settled to allow of its being carried on continuously. If a house is done up for the summer, the paint then executed in the spring is chilled by the cold and ruined by the unsettled weather. Or should the painting be performed later, say in the month of June or July, the hot sun dries up the oil, the really effective preservative property of the paint, before it can be absorbed. Such work is consequently worthless at the end of less than two years, whereas were it done at a later period the result would be a better appearance, lasting for perhaps double that time. Aspect should also be considered when external painting is required to be performed.

The Chairman (Mr. Scoles, V.P.) in reference to Mr. Wyatt Papworth's remarks on varnishing without painting, stated that the late Sir Authony Carlisle had the interior wood-work of his house in Langham-place, so varnished throughout, and the effect of the varnished deal was very like satin wood. The wood-work of the Swiss cottage, at the Colosseum, in the Regent's-park, was also only varnished.

Mr. C. H. Smith (H.M.) said, that in recommending the use of varnish, it was necessary to state what kind should be used. Any resinous substance in combination with an oil would produce a varnish; but the difference between a resin and a gum, which might resemble each other in outside appearance, should be clearly understood. A resin proper would mix with oil, but not with water; whilst a gum proper would mix with water and not with oil. After mixing a resin with any volatile oil, such as alcohol, spirits of wine, or oil of turpentine, and applying it to any substance, the oil would rapidly evaporate, and leave the resin in a powdery state, which could easily be sponged off. Many years ago he had applied mastic varnish to some drawings, but only a small remnant of it now remained, and a sponge would at once ex-

pose the surface of the paper. But if used with a less volatile oil, the varnish would produce a totally different effect, and, for wood-work, only copal varnish in oil should be used. This would give a very hard surface, as might be seen on the panels of carriages. Besides Sir A. Carlisle's house, he might mention a house built about the year 1813, at Brighton, by the late Mr. Bonomi, for Mr. Prince Hoare, in which the joiners' work was varnished, and it was in a very good condition many years afterwards, the varnish having acquired a very dark rich colour. With regard to cleaning paint, a solution of wood ashes was frequently employed formerly for washing either linen or paint. This mixture, if too strong, had a tendency to decompose the paint, and careless use of pearlash and soda would wash off all the paint, though if used gently it would effect the object required. With regard to paint, the only valuable quality of white lead was its extreme density. In the course of his early experiments he had tried to make a pigment from sulphate of lime, using the finest plaster of Paris; and, although this made a beautiful pigment, there was no body in it. This material was applicable to water-colour painting, if mixed with a very little gum, to prevent its brushing off. It had advantages over the white, generally used for water colours, and made of lead or zinc; and if the slightest film of it were used it would be almost transparent when laid on, but when dry intensely white. In experimenting upon magnesian limestone he had found that magnesia was also applicable as a water colour. He did not know of any sulphate or mixture of sulphur that would have any effect upon it. It was totally unaffected by the vapour from sewers or drains, and therefore superior to white lead for distemper painting.

Mr. J. G. Crace (C.V.) said that the very best way of treating wood was simply to varnish it, and not to smother it over with paint. Eight or ten years ago he had been employed to paint a house in the Isle of Arran, for the present Duke of Hamilton, and he had found the wood-work, of red pine, so free from knots, and so well executed, that he suggested that it should be at once varnished. This was done with great success, and the work had lasted, and looked now as well as when it was done. He believed paint had not been used as a preservative to wood before the time of William and Mary: before that time painting was a decorative process. The style of architecture and the use of wood seen in the buildings of William's day, altogether came, he thought, from Holland. Mr. Crace referred to a document in his possession, being a tender for painting the work at Greenwich Hospital, in the year 1696, by William Thompson. The price asked for painting outside work three times in oil was 8d. per yard. There was also a price for painting sashes, iron bars, and inside work, and for painting "three times in good linseed oil and well primed." Mr. Crace also referred to papers alluding to the "walnut" and "wainscot" colours mentioned by Mr. Wyatt Papworth. Among these were charges for "all outside painting 3 times in oil, at 8d." and for "all inside, walnut or wainscot, 9d. per yard:" these prices showed that graining was not intended. At this period (1696, seven years before the accession of Queen Anne) he believed painting was chiefly executed in white; for in cleaning off the paint from old wood-work of that age, he almost invariably found that the original colour had been white. A blue tint was afterwards used, and, in the time of George III. various shades of stone colour and drab. Graining and marbling were introduced into this country about the year 1782. Mr. Crace stated that his father (now far advanced in years) remembered their introduction by French workmen at Carlton House for the Prince of Wales: they were then considered as great novelties, or at all events as a reintroduction. With regard to the operations of painting, he could not too earnestly urge the necessity of careful "knotting," the neglect of which could not afterwards be remedied. The evil arising from this neglect was constantly seen in the common application of two coats of builders' paint, after which the dark spots showing the forms of the knots soon became visible. For bad work a remedy might be found in rubbing down, sand-papering, or pumice-stoning; but bad knotting could only be got over by scraping down to the knots themselves, and redoing the work from the beginning. The use of size colour was also to be guarded against, as its application in the first instance prevented the absorption of the oil paints by the wood, and all the after processes only formed a skin laid on the woodwork, rather than a coating to effect its preservation. When the sun (as in a window-shutter, for example), struck upon wood sized before painting, it was sure to crack and flake off. With regard to pigments, Spanish white was only whiting: none but those with a metallic base had any body at all. White-lead furnished the best body that could be applied to woodwork. Zinc paint possessed several valuable qualities, but it had very little body. Any one who had used it would know that after even seven or eight coats the grain of the wood could be seen; and he would call particular attention to the fact that zinc paint would not clean well. It had a face which might be compared to wax, and any attempt to clean it seemed to rub in the dirt, so that a bright clear surface could not be got, as with good lead paint. To clean paint he strongly recommended that the raw alkalies should not be used, as they would infallibly take off the flatting coat. The best mode of cleaning was by means of good soap, not too strong, laid on with a large brush, so as to make a lather: this should be washed off clean with a sponge, and wiped dry with a leather. With regard to varnish, nothing but copal should be used, as no other would stand wear so well. It was the most expensive of all varnishes, and therefore could not be applied good in cheap work.

In reply to an inquiry if there was any practical disadvantage in applying zinc paint upon previous coats of lead, Mr. Crace stated that the manufacturers of zinc paint appeared to have come to the opinion, that it was best applied as a finish upon a body of lead. Zinc paint had a good colour, particularly if of fine quality, and, under favourable circumstances, would last well. Some experiments which he had tried in a long corridor at the Houses of Parliament, under the direction of Sir C. Barry, where the manufacturers of the zinc paint conducted all the operations, seemed to show that there was practically no difference in the durability of good white lead and good zinc paint.

Mr. G. Godwin (Fellow) said that the testimonials in favour of zinc paint were very strong; and, if it had no other advantage, its prevention of the misery arising in the shape of painters' cholic, loss of hands, &c. from the use of lead, would make every member of the profession anxious to use it. His own limited experience had furnished him with two cases of failure, which he was told had arisen from applying the zinc without cleaning off the coats of lead paint underneath; and the intended white paint had turned out to be nearly black. Mr. Wyatt Papworth's paper had brought many valuable facts together, and would, no doubt, lead many to understand why one person could do painters' work thirty per cent. cheaper than another, and yet get more money by it. He moved the thanks of the meeting to Mr. Papworth for his paper.

Mr. Ashpitel (Fellow) referred to a large public dining-room in the City, where he had employed zinc white, with a satisfactory result, upon coats of red lead, and found that it was not affected by gas-light, as lead paint was.

Mr. Jennings (Fellow) observed that the use of paint had the advantage over ordinary varnish, that, besides protecting the work, it gave it a harder surface, and enabled it to bear a severer blow than if varnish had been employed. French polish produced the best effect; but if two coats of copal varnish were applied, and then polished, the effect would be as good, and the surface as hard as if the work had been painted.

Mr. Thomson (Fellow) referred to a case in which a pair of wainscot doors were carefully finished, rubbed down, and hand-polished to a satin surface. One side of these was afterwards varnished, and the effect was it bore out upon what was termed the figure of the wood, and it sunk into the softer parts; so that it not only produced a rough appearance, but also changed the actual texture of the wood, which, on being touched by the hand, was as coarse as a rasp, and some excellent work was spoilt by the experiment.

Mr. Crace said that, in the experiments at the Houses of Parliament, to which he had referred, it was clear that the zinc paint had not the marked superiority which was claimed for it. On the sanitary question he added, that the workmen did not like it so well as the lead paint. They said that it smelt sour, and made their throats sore. He had in his establishment men who had worked there more than five-and-thirty years with lead paint, without having a day's illness. He believed it depended entirely upon cleanliness, and, among the various artizans employed by him, he would match the painters against any others for healthy-looking men, and steady, well-conducted workmen.

Mr. I'Anson (Fellow) referred to a case in which zinc paint (mixed, he believed, with varnish) had been applied over distemper, and the work had stood remarkably well. His own experience was, that it required five coats of zinc to produce an appearance equal to four coats of lead paint. He found that the workmen nauseated and disliked the use of zinc more than that of lead; but he could not say whether the permanent effects of the latter were most deleterious or not.

The Chairman referred to the green-houses in the Palace Gardens at Salisbury, which had been painted last year, but the appearance of which had led him to ascertain that zinc paint had been employed, and that the result, he thought, was unfavourable on the score of durability.

Mr. Digby Wyatt (Hon. Sec.) said that, in any fine revival of the ancient or modern Italian styles of decoration, the effect of the other tints employed depended mainly on the brightness, purity, and durability of the white; and the most beautiful rose tints were obtained through the slightly transparent upper coat of white. In the use of lead paint, or other materials which had a tendency to turn yellow, this important advantage was lost, and it was desirable, therefore, to consider any material which appeared to possess a character of permanence and purity, with a view to arrive at something like the white pigments which the ancients obtained from their fine white marble.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

On Monday, the 16th, the ordinary general meeting was held, Mr. J. J. Scoles, V.P. in the chair.

Mr. C. C. Nelson, honorary secretary, announced various presents, including a portion of a donation from Mr. G. Wightwick, in the shape of 100 drawings, and five or six lectures delivered at the Athenæum, Plymouth, with easel and foot-lights for the drawings; and this, he pointed out, was especially deserving the best thanks of the Institute.

Mr. Digby Wyatt bore witness to the value of the donation, and

Professor Donaldson said he believed it was Mr. Wightwick's original intention to have left these works to the Institute in his will, but he had adopted this more agreeable method of presenting them to the Institute. He moved,—"That the honorary secretary be requested to acknowledge the donation in the most flattering terms."

The motion having been seconded, it was carried with applause.

Professor Donaldson, as honorary secretary of Foreign correspondence, presented a donation from M. Hittorff, of Paris; a memoir of Herr Schinkel, architect, of Berlin; and a profile bust of M. Roeland, honorary corresponding member at Ghent, who had sent them numerous donations, and amongst them drawings of candelabra in the church of St. Bavon, at Ghent, in brass and copper. They originally belonged to Charles I.; and on being sold with his effects, were bought by Bishop Trieste, of Ghent, and by him presented to the church of St. Bavon. The candelabra, of which there were four, were of considerable height, and they contained the arms of Charles I. The Institute had representations of other candelabra, designed by Buonarotti and Raffaelle, and as they were drawn to the same size, it was intended to have them placed together, so as to show those that were the actual execution, and those that were merely the designs, of these illustrious masters. They had also been favoured with a number of prints of the buildings M. Roeland had executed at Ghent, some of which were very interesting. One was of a large church at Brussels, now in course of construction; another, of a brilliant coffee-room, which he had added to one of the clubs of Ghent, entirely of marble; and they would be able from the drawings to form some idea of its beauty. There were also drawings of another church he was constructing at Ghent, and of a riding house and some shops. He (Professor Donaldson) had further to present, The History of the Academy of Fine Arts at Dusseldorf, by Herr Weigmann, architect, of Dusseldorf; also a donation from Signor Kaftangioglou, architect, of Athens.

The Chairman announced the decease of Mr. James Morrison, the well-known millionaire, who at the formation of the Institute not only became an hon. fellow himself, but put down his son's name.

The Signor Lysandros Kaftangioglou, architect, director of the Royal School of Fine Arts, Athens, who had executed a college for young ladies for the Queen of Athens; Herr Rudolph Weigmann, architect, Dusseldorf, Professor of Architecture, and Secretary of the Royal Academy of Fine Arts at Dusseldorf (who restored the great Gothic church of the Saviour at Duisburg, and is the author of various works on architecture, engineering, and perspective), were elected as hon. and corresponding members.

Professor Donaldson then read a "Memoir of the late Herr Zanth, architect, of Stuttgardt, Wurtemburg, hon. and corresponding member," and author of the "Architecture of the Wilhelma, or Palace of the King of Wurtemburg." The paper, which we have given in full on another page, was profusely illustrated with views of the gardens, and architectural features of the palace, and was received with much applause.

Mr. Digby Wyatt (in the absence of Mr. J. B. Waring, associate), read a paper on the "Arts connected with Architecture in Tuscany," beautifully illustrated with examples of stained glass, fresco ornament, and marble, enamel, and wood inlay, as practised in central Italy during the Mediæval and Cinque-cento periods.

Professor Donaldson thought they would all participate in the noble enthusiasm with which Mr. Waring

had taken up this interesting subject, and it was to be hoped that he would give them further information on it by way of complement to the series. Productions of this kind, conceived and carried out in this spirit of performance, were virtually the fulfilling of the purposes of all high art; and, perhaps, there could not be a more striking exemplification in England of the want of these grand adjuncts to the completion of the architectural picture, than the case of our own St. Paul's. Mr. Waring had laid it down that the useful should never be disconnected from the beautiful. He (Professor Donaldson) would adopt the converse of that proposition, and say that the beautiful should never be dissociated from the useful. It was the beautiful that gave to the useful its sentiment and its expression, and it was the beautiful that brought home conviction to the mind and feeling, and without which no impression was made upon the heart. Let us look at St. Paul's itself. There we found a building in fine harmonious proportion —there we found a building of very considerable size: it was carried out with great skill and study, and grandeur of design; but whoever entered the interior of St. Paul's felt, as it were, a chilling effect, arising from a want of combination with its architectural beauties of those subsidiary arts and decorations that, if introduced, would render it inimitably impressive and imposing. Now, if St. Paul's had been carried out with stained glass windows, and fresco or mosaics, enamel inlay, or marquetrie, in various parts of the building, what a gorgeous effect would be produced upon the eye and upon the mind, and what an effect, abstractly considered, would be produced by that glorious work of the greatest architect this country had produced. Why, we should all be warmed by a sentiment of inspiration as we entered its splendid portals, instead of being chilled by the monotony and want of ornament that reigned through its immense recesses. Nothing could be more appropriate for introduction into St. Paul's than the decorations described by Mr. Waring and Mr. D. Wyatt. It was painful to reflect how poor and niggardly we were in this country, and how marked the contrast was in the case of similar structures carried out in Paris, where the Church of St. Vincent de Paul, which had all these embellishments, had been carried out at a cost of between 90,000*l.* and 100,000*l.* But where could they get such a munificent amount to carry out these works on such a scale in our London churches? In the Church of St. Vincent de Paul the windows were painted in the way described by Mr. Waring. Each window was a splendid picture, and each picture formed part of the entire architecture; and instead of your building being cut up into so many holes letting in the glaring light of day, you had pictures and windows of the most resplendent colours. This was also the case in the Church of St. Gudule, at Brussels, where there were beautiful pictures in the transepts, and beautiful Cinque-cento pictures in the apsidal chapels round the choirs; although there in discordance with the style, but which in St. Paul's would be at once harmonious and imposing. It had been said there was an objection to receding pictures, but, to a certain extent, they must be receding, otherwise they were tame and flat. At Lille he saw this carried out at the ends of the side aisle, which had a perspective representation tending to extend the length. At first sight it had a very happy perspective effect, but as you approached it, it was lost; but there was a great deal of art introduced to carry out the idea of the architect. It was not for the architect exclusively to restrict himself to mere geometrical form and line, but rather embellish his architecture with such ancillaries as they had had described that evening. What he much admired in the paper was the logic of Mr. Waring's mind. It was no common mind treating the subject, and, by means of able analysis, leading to an important ultimate purpose, showing how the proposed system was not likely to obstruct the building, but that it was conducive to great effect on the mind of the beholder. If we wished to produce noble impressions on the mind of the spectator, it was by using all those accessories that might appropriately enter and be applied to the architecture of a building. In Gothic architecture, the architects had had the advantage of introducing a great number of these elements of beauty into their buildings; and it had been from a fearfulness and hesitation that the public mind had not been prepared to receive the like decorations in the Classical, or, as he would term it, the Italian style of building; but no doubt, if they wished to convey the best possible effect, it was by the introduction of such assistance as Mr. Waring had so ably brought under their consideration.

Mr. C. Barry conceived that all must feel how difficult, in the pursuit of their profession, it was to have all their ideas fully and harmoniously carried out,—difficulties connected not only with the taste of the artist or architect who designed, but sometimes in the want of the sinews of war. They would all agree in the view that had been taken with reference to the great national monument, St. Paul's. The nation's purse could do what no individual could accomplish, and it was a consummation that all architects and artists alike must desiderate.

Thanks were voted, and the Chairman having called attention to a contrivance, for striking the centre of circular drains, by Mr. James Buckle, clerk of works, and a model of which was laid on the table, the meeting was adjourned to November 30th.

THE ARCHITECTURAL ASSOCIATION.

SQUARING DIMENSIONS.

On Friday, the 13th inst. the semi-monthly meeting was held, Mr. J. Norton, Vice-President, in the chair. Mr. Bunker, Honorary Secretary, read a communication which had been addressed to the Council of Plymouth touching the advertisement for designs for a guildhall, which asked:—

"1. Will the architect receiving the highest premium be employed to carry out his design at the usual per centage, provided his competency is found to be undeniable?

2. Will professional assistance be sought by the committee in enabling them to award the several premiums?

3. Will there be a public exhibition of the designs previously to the selection being made for the premiums?

4, and lastly. Will the committee pledge themselves to reject all designs that do not fully and honestly comply with the whole of the conditions contained in the instructions furnished to architects?"

The speaker added that no reply had been received, but they had heard privately that since the communication had been transmitted, the competition had been deferred. Mr. Bunker also read a letter of considerable length from Mr. Hewitt, in which he dealt with the question of competition generally, but which it was determined not to adopt or forward until some further information was received from the Council. The suggestions in Mr. Hewitt's communication were contained in the following programme at the conclusion of his letter:—

"1. Rough sketches only of the proposed design in outline, slightly tinted, to be prepared to a scale of 20 feet 1 inch, to consist of the following drawings only, viz. a plan of each floor, one elevation, one section, and one external perspective view.

2. The design to be accompanied by a general description of the materials and construction, capabilities and areas of office, &c. and an approximate estimate.

3. These sketches to be taken into consideration by the Council, and a number not greater than twenty-one, nor less than eleven, to be selected, the authors of those selected to be alone entitled to conditions and terms first issued.

4. The author of the best design to be employed to carry out his design upon the usual terms, unless any serious objection exist.

5. The premiums, amounting in this case to 500*l.* to be awarded to the remainder of the limited competitors, in the order and in the proportion the Council think deserving; no premium, however, to exceed 50*l.* nor to be less than 10*l.*

6. Three architects of repute, and entirely disinterested, to be called in to report on the designs, and assist the Council in making the award.

7. The designs not to be publicly exhibited until after the award is made.

8. Any canvassing on the part of any competitor, either directly or indirectly, to disqualify and exclude him from the competition.

9. All designs to be submitted under an assumed mark or motto, and which in no case is to be one by which the author's name may be divulged."

The Committee on Competitions reported that they had met, and that the following resolution was carried unanimously, viz. "That this committee believe that any code of laws which is not generally adopted by the profession is quite inadequate to deal with the present evils of competition."

Subsequently the following resolutions were carried: "That the committee consider it desirable that a series of inquiries and suggestions should be framed for the purpose of conveying information and assisting committees in preparing the conditions of future competitions, and for their guidance in arriving at their decisions. And that it is desirable that a sub-committee of the Architectural Association be appointed to draw up suggestions, to be forwarded to all parties having the conduct of competitions; and that they submit the same to the general body."

The report of the committee was adopted; and the same committee reappointed to further consider and pursue the subject.

The chairman then stated, relative to the occupation by the Association of a part of the new buildings of the Architectural Union Company, in Conduit-street, the following resolution, which it was proposed to consider and discuss at the next meeting:—

"That regard being had to the importance of securing a union-point for the profession, and the favourableness of the present position of the Architectural Union Company, it is advisable that the Architectural Association should take steps to assist in the object, by its removal to the premises of the company."

Mr. Rickman then delivered a *viva voce* dissertation on "Squaring Dimensions," but which rather took the form of a *résumé* on the "arithmetic of architecture" generally, and which it would be impossible to deal with without diagrams. The speaker said, if they properly studied the subject, they would find that it was one of the greatest interest: it moreover trenched closely on a subject which was now being greatly discussed,—that of the adoption of the decimal system. The great difference between our own system and the French system and foreign systems generally was, that in our dimensions we more frequently made use of the duodecimal than of the decimal; and, when we got above the fractions of shillings and pence, and treated of pounds, we rarely followed out the decimal system. The influence of the duodecimal system was so great, that four out of five of the dimensions we squared, in going through great quantities, were influenced entirely by the duodecimal system. He did not intend to go into the subject, as had been done with another subject in another place, by treating of the antiquity of squaring dimensions. He had not been either to the British Museum or to the library of the Institute to read up old works on the subject, to ascertain how they squared dimensions in the days of Sir Christopher Wren,—whether the cubical contents of Stonehenge or the masses of the Pyramids were superimposed or calculated by decimals or duodecimals, or whether the ancient works of the Piræus at Athens, or the palaces of the Greeks and Romans were by scale work. Those who were in an architect's office might be considered as being pretty well masters of duodecimals, but not so of decimals; and if instructed to square a whole parcel of figures, and they did it by the old system, it would be comparatively a process of drudgery, and they would take no interest in it: but if they took an interest in it, they would find out a happy knack of their own, in working out their arithmetic, of eliminating certain dimensions, and of combining them mentally in many ways. Of all the mental calculating processes we went through in figuring, that of getting rid of the factors—of multiplying or dividing together various factors so as to produce unity, whether that unity was 1, or 10, or 12, or 100, or more,—this process of eliminating or getting rid of the superfluity of figures was the most interesting and valuable in the subject they were then considering. To do this a knowledge of the composition of numbers was of the greatest importance. Thus the composition of 10 and 12 was manifestly different,—that of 10, as a concrete number, being 2 multiplied by 5, and 12 being $2 \times 2 \times 3$. Other numbers might be combined in a more complicated way. They knew the difference between prime numbers and concrete numbers, and the happy knack of introducing the component parts of concrete numbers was of great importance. Though it might at first appear that the duodecimal was more simple than the decimal, still, practically, the fact of our always using decimals in higher numbers showed that it was the most simple and available; and although we more frequently made use of 12, still he hoped some day to see the decimal system, in squaring up ordinary dimensions, adopted. A very useful elementary exercise was that of going through a course of dividing 1,000 up into its aliquot parts; and another interesting process consisted in multiplying several given symbolic figures by the same symbolic figures; and Mr. Hay, of Edinburgh, in his work on arithmetic, pointed out several interesting characters of this kind in the works of the ancient Greeks, and in more modern works. There was another method of looking at figures which some had, and which, though it did not much facilitate, served to assist the mind overtasked by long squaring: it was the system of *Memoria technica*, or artificial memory—the adoption of a set of symbols irrespective of the subject under consideration, and which, by means of a code, were referred from one to another, so that any given lines of gibberish, or forms, might be made to denote the reigns of kings and dates, and so become the representatives of numbers. He would not recommend the adoption of this system, for what we wanted instead of the *Memoria technica* was a thorough knowledge of concrete numbers. The higher and more rapidly you could run up in reducing your 1,000 into its aliquot, the more useful would it be in squaring dimensions. There was another division of numbers, which was practically of great importance in the sur-

veyor's office; namely, the determination of the aliquot parts of a foot superficial in inches. Mr. Bidder, who might be said to have "lisped in numbers, for the numbers came," the Swiss calculating boy, and others, used the decimal system—from unity downwards, or from unity upwards, according to the decimal association; or, as Professor De Morgan termed it, "the all 10 system."

THE DIFFERENCES IN BUILDERS' TENDERS.

I TRUST you will excuse this attempt to solve the perplexities of some persons who have, at various periods, favoured you with amounts which appear to mystify them, and which have been headed "Blind Builders." The subsequent paragraphs are intended to show that those who have received that designation are so called from a want of acute perception by the parties who have thus named them, and that the distinction (?) recoils on such as cannot see through the operation of the "force of circumstances," and may prove them to demonstration to be blind contributors, who misapply the appellation most suitable to themselves, or they would see some of the following reasons for the glaring discrepancies observed in divers valuations.

When quantities ARE NOT *supplied.*

The haste with which some estimators found their tenders on the area or the cubic contents of a building, causes them often to exceed greatly, and as frequently to fall far short of, the totals of their more circumspect neighbours, who carefully wade through the specification, and measure the drawings, &c.

When quantities ARE *furnished.*

Indefinite wording may cause the real meaning to be misunderstood.

The insertion of general descriptions, including many details, and which may be classified as "sporting items," leads to confusion.

Manuscript instead of lithographed blank bills, with the errors made in copying not properly corrected; and the occasionally indifferent penmanship, involving uncertainty as to the figures, &c.

Whether quantities ARE RENDERED OR NOT.

Ill-framed and loose specifications, and inadequate drawings.

Incompetence in the person who prices.

Carelessness in moneying out after the items are rated.

The utopian impetuosity of building owners; who, when they determine to erect a mansion, house, factory, &c. imagine that *their work* should perforce take precedence over that of every other individual; and who constantly urge that the artificers ought to be immediately on the ground,—that the season will pass away to their loss; thinking all difficulties surmounted till pay-day—that bane of all diurnals, which they desire to be delayed as long as possible; and wishing the structural features to appear completed in an *im*possible time; thus hurrying on the architect, surveyor, and builder; putting an evil *con*struction on their labours, "holding them up" to the contempt their employers in such cases alone deserve, and laughing at such as "go to the wall" from want of opportunity to examine, and if needful, revise their calculations.

Even highly respectable competitors, who have other works in the same locality, are able and willing to execute contracts at a lower price than men "of the same standing," who would have to send plant and workmen into the district for the sole purpose of carrying out one object.

Contractors, who are not busy, are often glad to take a large building in hand for a "lump sum," that will barely, or perhaps not quite, return to them their outlay, in order that useful, active, and intelligent men may be retained in their service, and give their masters the chance of turning their abilities to profitable account on some future occasion. Again, such as have extensive works on hand sometimes tender at a sum sufficiently large to insure the rejection of their offers, being unwilling to seem disinclined to submit a price, although not eager to enlarge their present responsibilities.

Sometimes tradesmen in a "small way of business" are artfully ready to lose now, to obtain the name of cheap, or strictly *honest* contractors, with the ulterior determination to charge an extravagant sum for what they see in perspective, and expect to have offered them afterwards, without competition.

Fluctuations in the prime cost of goods cause such variations as the following:—One tradesman, having had money at command, at the right time, invested his capital in the purchase, "at a bargain," of a large stock of materials that happened to be just called into requisition, to a considerable degree. Another was unable to become proprietor when the same articles might have been obtained "for a song;" and he knows that while he has the power he must buy, though a better speculation offers, *now*, before the supply is cut off, although they have risen to an unprecedented market value. While a third has all his property "locked up," and will be compelled to borrow, at a high rate of interest, to secure at any sacrifice what he requires, by the date he is under the necessity of using the same.

Observation has taught many, that although the overseer has, from habit or otherwise, stated that all the materials are to be of the best description, and that the labour is to be performed in the most workmanlike manner, his practice, from timidity, ignorance, or incessant occupation, is often to allow the concrete to be little better than the soil removed to make room for it; the bricks to be the refuse of the field; the stone, such as has been repeatedly rejected, previously to removal, from the quarry; the timber and deals sappy and shaky; the iron castings foul; the ironmongery of the most trumpery kind, and such as becomes the aggravating source of continual complaints, a nuisance to all who handle it; the plaster to be mixed up with the *débris* from the old building (when there has been one on the site before); the lead lighter than specified, and improperly laid; and the whole of the work put together as badly as the extent of the most flexible conscience of a thorough "scamping builder" will permit.

When "pettifogging" upstarts are included in the list of competitors, one, never intending to pay for the materials he has the dishonesty to contemplate using, can undersell them all; become a bankrupt, and quietly taking care of "No. 1;" decamp, to the chagrin of all with whom he had to do; and recommence his malpractices in another town, where his want of character is unknown—indeed, in a place in which he is not notorious. Sometimes men of the latter class, who are acquainted with the fraudulent disposition of particular men, who may "have an eye" to building, enter into an agreement with the last-mentioned, that they shall, by "putting in low enough," have the work secured to them at the amount of the next highest tender, the excess being privately paid. The competition is merely a gross sham, to defraud the conscientious of his legitimate chance, and the architect of part of his proper commission.

Fortunately, this parasitic race is not numerous, and, as a body, builders are "honourable men;" yet so are not all.

Two cures for the above abuses present themselves;—first, for the profession to found their charges on personal, fair valuations; and, secondly, for an able clerk of works to be invariably appointed to each building of any importance.

"None are so blind as those who *will not* see."

L. BIDEN.

RAILWAYS AND OTHER ENGINEERING WORKS ABROAD.

WE proceed to lay before our readers a list of various engineering works abroad, projected or in hand.

FRENCH RAILWAYS—NEW CONCESSIONS.

A.—*To the Northern Railway Company.*

1. Paris to Soissons, to be done in three years.
2. Boulogne to Calais, branching to Marquise, in three years.
3. Amiens to Tergnier, on the Creil and St. Quentin line, in six years.
4. A cross line from the Lille and Calais line to the Paris and Lille railway, in five years.
5. Chantilly to Senlis, in three years.
6. Pontoise to the Belgian railway, in two years.

Also may be included the Amiens and Rouen, in which the Western Company participate for one-third, to be done in six years, and a line from Ermont to Argenteuil.

Concessions to become definite if claimed by companies, or the Government, within four years, and to be completed in eight years from date of concession.

1. Soissons to the frontier, by Laon, Vervins, and Hirson.
2. From the above line to a point between Busigny and Landrecies.
3. Senlis to the Paris and Soissons line.
4. Beauvais to a point in Paris and Pontoise railway, which the Western Company are about to construct.

B.—*Concessions to the Orleans Railway, to be done in eight years.*

1. Paris to Tours by Châteaudun.
2. Nantes to Napoleon-Vendée.
3. Bourges to Montluçon.
4. Toulouse to the Montauban railway, by Albi.

Conditional concessions to become definite if claimed in four years, and to be done in eight years, are as follow:—

1. Tours to Vierzon.
2. Orleans to a point in the Bourbon line, between Montargis and Briare.
3. Montluçon to Limoges by Guéret.
4. Poitiers to Limoges.
5. Angers to Niort.
6. Limoges to Brives.

The lines left by the Grand Central (now fused into the Orleans and Lyons lines), are for completion:—

1. Montluçon to Moulins.
2. Limoges to Agen.
3. Coutras to Périgueux.
4. Montauban to Lot and to Rodez.
5. Arvant to Lot.
6. Périgueux to the Montauban railway.

C.—*The convention relative to the fusion of the Lyons and Mediterranean lines into a Paris and Mediterranean railway divides them into three groups—the ancient, modern, and eventual.*

The first is composed of those open for traffic; also the Besançon and Belfort, Dôle and Chagny, Dôle and Bourg, Marseilles and Toulon, and Lyons and Geneva, in course of construction.

The second comprises—

1. Lyons line by the Bourbonnais, the St. Germain-des-fosses, and Clermont, Arvant, Puy, and St. Etienne lines.
2. Nevers and Moulins to Châlons, Châtillon to Montbard; Salins to Verrières and Jougne; Montbeliard to Delle and Aidincourt.

Delay of execution for all these, eight years.

The eventual group, to be conceded in four years at least:—Brioude to Alais, Montbrison to Andrezieux, Privas and Carpentras, Toulon to Nice, Avignon to Gap, Gap to the Sardinian frontier, if the Piedmontese line will be constructed to meet it from Susa.

All to be done in eight years from date of concession.

A line is projected from Vitay-le-François to Nevers, by Troyes, Brienon, Auxerre, and Clamecy, which, about 1,000 mètres long, will be the means of completing the long line from Bayonne to Strasbourg.

The line from Lille to Strasbourg is conceded to three companies:—1. Bassigny to Herson, to the "Northern;" 2. Herson to Thionville, to the "Ardennes" Company; 3. Thionville to Strasbourg, to the "Eastern."

Bességes and Alais Railway is ready to be opened in a few days.

Branch of the Caen line, from Lissieux to Honfleur.—Earth-works about half done as far as Pont-d'Evêque. From thence to Honfleur, the only work commenced as yet is the Hébertot tunnel, eleven shafts, of 50 mètres depth thereabouts, having been sunk; the *heading* is now through from end to end, so that the water, which occasioned much trouble and expense, now finds its way out at the lower end. The Lissieux tunnel will be through in a very short time. The line will be open to Pont d'Evêque in about a year. The line from Toulon to Nice is being constructed, under the direction of Mr. Gaduel, who has taken up quarters for himself and staff of assistants at Cannes. The important line from Lyons to Bordeaux is conceded to the Orleans Company: it is to pass by Clermont, in the mountainous district of Auvergne, by Ussel Tulle and Brive.

The Lyons and Grenoble line is decided to be constructed in the valley of the Ainan.

The Kehl-bridge over the Rhine, near Strasbourg. The *Convention* of July 2, 1857, states that—

1. The bridge will traverse the Rhine opposite the Bavarian Custom-house.
2. To be lattice ironwork for double line, with footpath for the public on one side.
3. A swing bridge, of 30 mètres opening, to be placed at each end.
4. The length of bridge to be 265 mètres; four piers in the river, 63 mètres from face to face.

After the inauguration of the railway from Chalons-sur-Marine to the camp, M. Duméry, locomotive engineer-in-chief to the Chemin de Fer de l'Est, submitted to the Emperor Napoleon a new locomotive, with furnace to consume its own smoke. This is effected by making use of an inverted syphon, through which the coal passes, and is carbonised in its upward passage, becoming coke when it reaches the level of the fire. The smoke is consumed in its upward passage through the upper stratum of incandescent coke. Sarrebruck coal was used, and the result satisfied the authorities.

Surveys are to be made from Avignon to the Alps, by the valleys of the Durance and the Coulon rivers.

In Holstein, the Gluckstadt and Itzehoe is verging towards completion.

Denmark.—Lubeck and Hamburg line conceded to the Lubeck and Buchen Railway Company.

Bavaria.—By the opening of the line from Munich to Rosenheim, which was proposed for the 12th October

(the *fête* of the king), the whole line will be thrown open from Caen, by Paris, Strasbourg, Munich, to Rosenheim, except the bridge over the Rhine above mentioned.

The Ligurian coast-line is advertised for concessionists by the Sardinian Government. Specification to be seen at the offices of the Sardinian legation in the capital cities of Europe—London, Paris, &c. It is to start at the river Var, the Nicene frontier of France, and end near Spezzia, at the Modenese frontier. Tenders to be sent in before January 1, 1858.

Saxony.—Interesting surveys are being made between Annaberg and Bohemia, in that very mountainous part of Europe.

Bohemian lines open this year—Toeplitz to Assig, Parderbitz to Kœniggratz, Kladno to the iron mines of Nutschitz.

The Portuguese Government have refused subventions to new companies. The line from Lisbon to Oporto is finished, or nearly so.

A company has been formed to drain the Venetian marshes, on the shores of the Adriatic, from Venice to the Isonzo.

The François-Joseph group of Austrian railways proposes to limit its former scheme by suppressing some branch lines.

On the Northern Spanish Railway, the section Vittoria to Nanclaus to be shortly commenced. Contract taken at five per cent. under the schedule of prices.

The line from Nocera to Cava (Naples) was opened on 31st July last. The gradients are from 1 in 100 to 1 in 50 and 1 in 40, and heavy works were obliged to be made for the purpose of avoiding steeper ones. The engines, of a new construction for heavy inclines, were made in the workshops of the railway, on the spot, under their chief engineers, one French and another Neapolitan.

Prussia.—The Dortmund, Witten Steele Essen and Mulheim Railway, have, after much delay, obtained authorisation to construct it.

Spain.—Saragossa to France: commission of French engineers appointed to report.

The Archduke Max has obtained from the Emperor of Austria the power to construct all the Lombardo-Venetian lines as projected, and hopes at the end of the next year to see Piedmont and Lombardy united by railway.

The rapidity of execution of the works in construction between Naples, the States of the Church, Tuscany, Modena, and Lombardy, is the admiration of every one.

The high bridge over the Reno, near Bologna, has fifteen arches, of large span: 1,000 workmen are employed on it.

The Chaumont and Langres section of the Paris and Mulhouse line was opened to the public on 1st October.

The line has, in the above section, nine cuttings, two tunnels, and seven bridges. In 34 kilomètres it crosses the Marne river four times.

The late heavy rains have retarded the opening of the Bességes and Alais line.

Surveys have been commenced on the new line from Paris to Soissons, lately conceded.

Surveys are also being made for a line from Caen to Angers.

A new line is projected from Dieppe to Paris, by Neufchatel, Forges, Gournay, Gisors, to Pontoise, on the Northern line, and Argenteuil, on the Western line.

The French engineers who have levelled over the continuation of the Kursk-Kowno line to Liebau, report that it should run by Liebau, on account of the insurmountable difficulties, and be prolonged to Riga by Dunaburg.

The same engineer, M. Duméry, who invented the new furnace for burning French coal in locomotives, has also just brought out a new apparatus (adaptable to all steam-engines), called a "*conduit réchauffeur*." By means of this the steam is passed from the boiler into a heating cylinder, in which its temperature and density are gradually increased before it enters the working cylinder. This increase is so contrived that at the commencement of the stroke the steam enters the working cylinder but slightly augmented in temperature and density, and that the maximum of these two is attained only after the stroke has been completed by the piston.

The Western Swiss Railway has commenced works between Iverdon and Vaumarcus.

The Provincial Council of Turin have voted 8,000*l.* in favour of a new line from Savona to Turin.

Hungary.—The line from Temesvar to Szegedin was opened for traffic on the 24th ult. Thus the route is complete from Vienna to Temesvar except the passage of the river Theiss, which is to be spanned by a magnificent iron bridge, mast-high above water, to be finished next June. The traject is now performed by a substantial temporary bridge and temporary deviation of the line at that point.

The Victor Emmanuel Railway purposes completing its junction across the Rhone next summer, at Culoz.

It is not true that the Seville and Cordova line has been finished, as reported lately in some papers: 11 kilomètres only are contracted for, viz. from Lova to Penaflor. The whole line is expected to be opened in the beginning of 1859.

The works of the Kœnigsberg line to the Russian frontier are to be commenced before this winter.

Mons and Haumont Railway works very actively carried on. To be open in six weeks.

The prolongation of the Munich line from Rosenheim to Saltzbourg will not be authorised until the line from Linz to Passau is seriously put into hands.

In Denmark the Gluckstadt and Itzehoe line is to be open in a few days.

The Duke of Rianzarès has obtained the concession for the Lisbon and Cintra line.

The French Government, to conciliate the wishes of the interested, will give approval to prolongation direct of the Burgundy line to the Sardinian frontier, near Chambéry.

The Northern Railway has ordered for its numerous new concessions 30,000 tons of rails, and 10,000 tons of chairs.

Great activity on the Caen and Cherbourg works. The marshes of Cotentin present some difficulty, the embankments subsiding rapidly by their own weight into the soft ground; but the contractor hopes, by continued filling, to gain solidity at the end.

A French engineer proposes to run tramways for horses from the Provence lines to the favourite resorts of strangers, &c. Hyères and Cannes, &c.

THE IMPROVEMENT OF THE CONDITION OF THE ENGLISH WORKMAN.

Considering the enormous wealth of this country, viewing accumulated property in a mass, as well as the huge fortunes which have been gathered up by individuals, it would seem that we are a thrifty nation. Unfortunately, nevertheless, in many points we are both careless and extravagant. It would be easy to give a long list of particulars which would explain our meaning, and show that in many instances those who had the means of preventing it have wasted human life by not making certain necessary provisions; and that the industrious class, the mainspring of the prosperity and strength of England, have not been sufficiently careful of themselves.

A change is coming over the management of our workshops and manufactories: the introduction of steam power, and the subdivision of labour, which has, in a great measure, been the result, have caused colossal establishments to rise up which are really wonderful to behold. Fifty years ago, a manufactory which employed 100 men was an establishment worthy of notice: now we may travel over this land and see it thickly studded with works where from 1,000 to 2,000 hands are busily employed. Whether this concentration of human power will be eventually better for the working classes, or otherwise, is a question worthy of the most careful consideration, but which we will not now attempt to discuss. One thing, however, is certain, that some of these manufactories, including the men employed and their families, have a population of 3,000 or 4,000, enough living people to occupy a small town. Amongst such important bodies of the English people, there should be provisions made of extent in proportion to the magnitude of the subject. If local government is found useful in towns, would not a system of management in these large communities be equally valuable?

We are induced to bring this matter before our readers, in consequence of various conversations with both the managers and workmen of several large manufactories. In most cases the masters are most anxious to do all in their power for the benefit and improvement of the social position of the men, but there seems to be a fear on their part of being intrusive: the operatives are similarly sensitive, and so it is that little in comparison with what might be done is effected. It is a pleasant circumstance, that in Lancashire and elsewhere, the masters and the workpeople have, in some instances, acted together in that kindly and wise way which is to the advantage of all parties; but in the great majority of cases this has not been done, and there can be no doubt that many means of saving money, and also adding to the comfort of the employed, is lost by the want of agreement between the great body of the men and their employers.

In many very important establishments, no provision is made for sickness or accidents; and yet how easy it would be to devote a few pence weekly to a fund for that purpose. At Stephenson's (Newcastle), each workman pays a penny weekly, and with part of this sum a donation is made to the town infirmary, which gives the means of admission for a certain number to that institution, and the remainder of the money is distributed in weekly sums to those who require aid. In other places, where large numbers of persons are employed, some have moved in the right direction; but nothing in proportion to the importance of the subject, has yet been carried out; and believing firmly that, by system, the English workman may be able to provide for himself and family in an independent manner, a cheap and wholesome dwelling, provision in sickness, cheap and good education, and medical advice, we invite consideration to the subject.

It is worthy of note that the ribbon weavers of Coventry are, to a considerable extent, their own masters. A large number possess looms which are worth 40*l.* and upwards. The purchase of such expensive matters by workers who, on the average, earn not much more than twenty shillings a week, is a remarkable instance of both thrift and industry. Many of these looms are placed in various parts of the town, in rooms in the upper stories of the houses, and during the last few years steam power has been applied to many of them by placing steam engines in central situations, and then laying on the steam power as the water companies do water to the various houses. It is evident that some difficulty must be felt in adapting many parts of the ancient city of Coventry to the purpose above mentioned. It is customary for the ribbon weavers and their families to live in the rooms which contain the looms, and it is certain that some of these are not well situated. In order to remedy the evil complained of, the Messrs. Cash (we are told by Mr. Cooper, in a contemporary) are erecting a block of 300 houses, in a pleasant neighbourhood outside the city. The looms in all these houses are to be turned by one huge steam engine, and the tenants of the houses are to have the enjoyment of gardens. This is a step in the right direction which is worthy of the greatest praise.

Mr. Cooper states that out of between 3,000 and 4,000 looms which are at work in Coventry, fully three-fourths are the property of "men who have had to practise hard saving and self-denial." In some instances schemes of union and mutual assistance, similar to the freehold land and building societies, have been resorted to, and we are told that the value of looms alone which are the property of the workmen amounts to 120,000*l.*; and to this 10,000*l.* or upwards must be added for winding-engines, filling-wheels, jacks, &c. We should be glad to find them extending their views to the purchase of dwellings.

IRON TRAMWAYS IN LONDON THOROUGHFARES.

An improvement for which we have long contended is now about to be begun by the General Omnibus Company, or rather by a special company, already registered as the London Omnibus Tramway Company, and which has been originated by the management of the General Omnibus Company, whose constituents have authorised its formation, and voted the requisite supplies out of their surplus funds. The subject was brought before the General Omnibus Company in the reports of the Gérants and Council of Supervision at an extraordinary general meeting held on the 10th inst. From these reports it appears that the line of tramway to be first formed (under approval yet to be obtained from Parliament) will traverse the New-road, beginning at Notting-hill-gate, and running *viâ* Grand Junction-road, New-road, City-road, and Moorgate-street, to the Bank, with branches to the Great Western and North-Western railway stations, and to Fleet-street *viâ* Bagnigge Wells-road. The estimate of capital required is 50,000*l.* The new tramway omnibuses, according to the report of the engineer, Mr. James Samuel, will weigh about 2 tons instead of 21 cwt. and carry sixty passengers instead of twenty-one, at a speed of 8 miles an hour instead of 6. The fares will be lower than at present, and the traffic, it is estimated, will probably be doubled. The new break is considered to be of special importance in the stopping and starting of these tramway omnibuses. It has not been decided whether they will stop only at fixed stations, or wherever called upon by passengers to do so. The engineer's estimate of cost is as follows:—

8½ Miles of double tramway (including sidings) at 3,000*l.* per mile	£25,000
34 Omnibuses, at 220*l.* each.....	7,480
320 Horses, at 26*l.* each	8,320
Law, Parliamentary, engineering, and preliminary expenses.....	5,000

The tramway will be double, and flush with the surface. It will occupy the middle of the road, and will be of hammered iron, on longitudinal bearings.

Alloway New Kirk and Burns's Monument.—The higher the walls of the new church at Alloway-rise, says the *Ayr Advertiser*, the more evident appears the accuracy of our first impression, that it all but ruins Burns's monument. The expression of regret and indignation, instead of passing away, as Mr. Baird might imagine, is deepening and spreading.

FIG. 2.

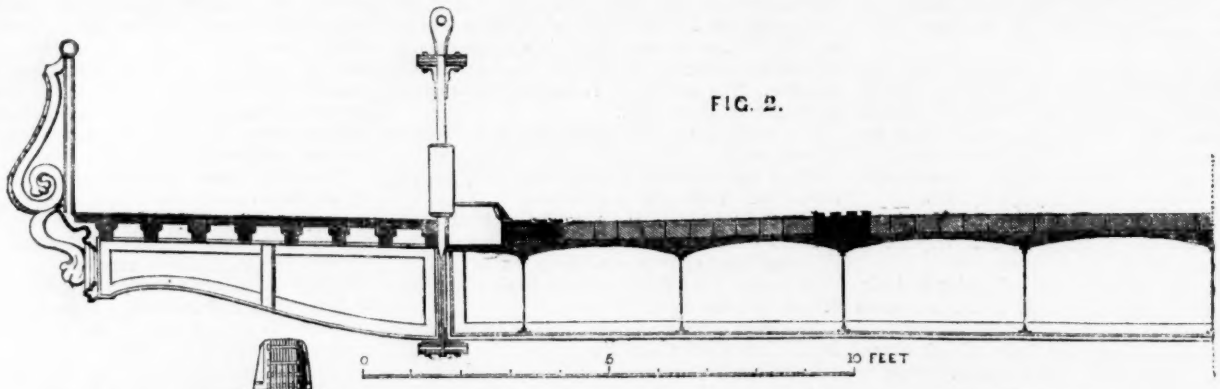


FIG. 3.

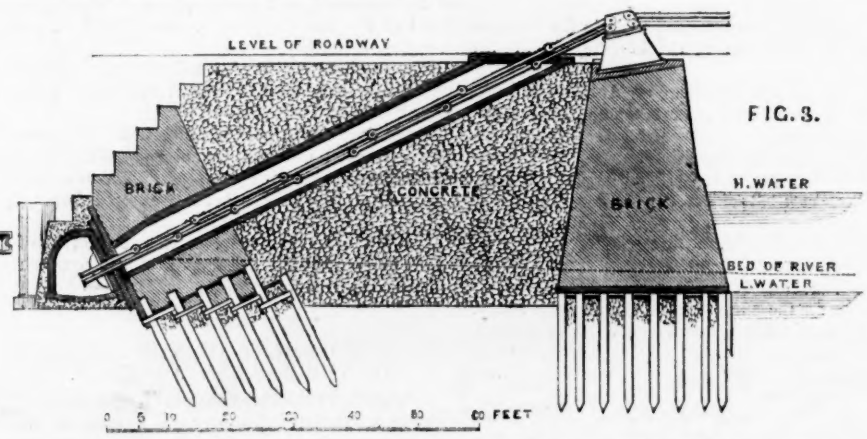


FIG. 1.

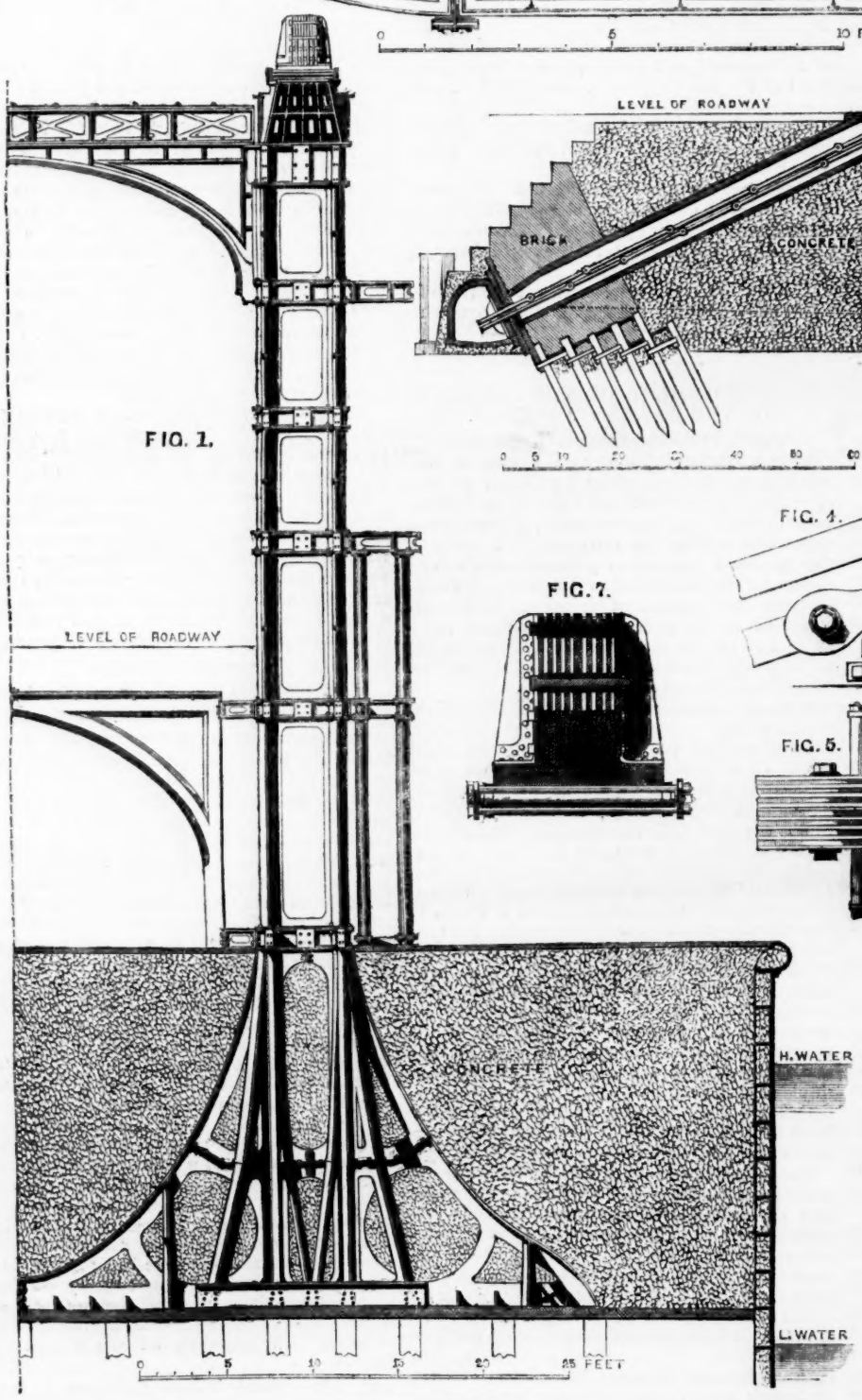


FIG. 7.

FIG. 4.

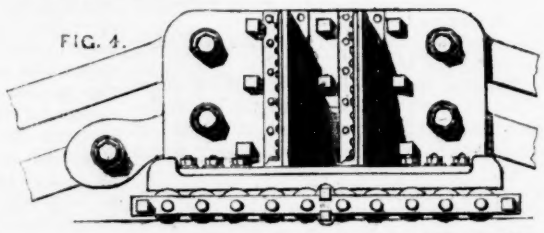


FIG. 5.

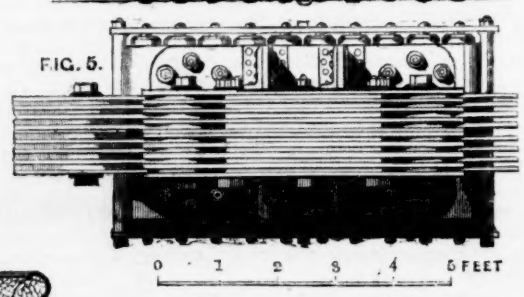


FIG. 6.

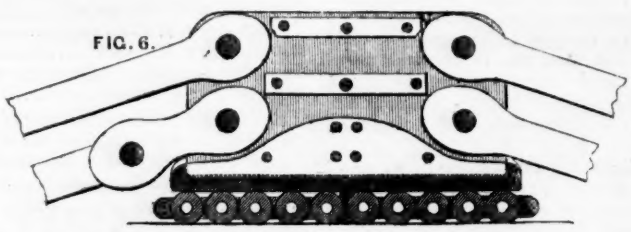
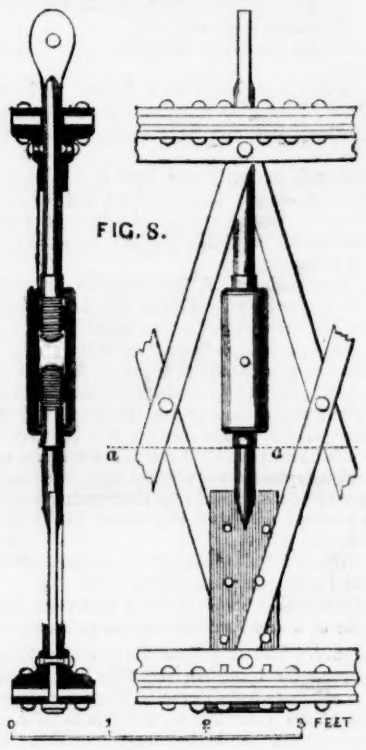


FIG. 8.



CHELSEA SUSPENSION-BRIDGE: DETAILS.

CHELSEA SUSPENSION-BRIDGE.——Mr. Thomas Page, Engineer.

CHELSEA SUSPENSION-BRIDGE.

In a previous volume (XII. p. 186), we gave a view of the Suspension-bridge, then in course of construction over the Thames at Chelsea, together with descriptive particulars of the foundations and superstructure. The bridge is approaching completion: January is to see it opened: the approaches are formed, and the embankment of the Thames adjoining it, on the Middlesex side, is completed, and we now therefore add to the previous illustration a view at large of one of the piers, with the cast-iron columnar towers which carry the chains, and various details of parts of the construction. A comparison with the previous view shows that some few alterations in form have been made: for example, the towers are now in one story, up to the bearing point, instead of two; and the pointed shape of the arch over the roadway and below it has given place to the semi-circular and elliptical form. The dimensions have been but slightly altered. The total length between the abutments is 705 feet; and including the abutments, 915 feet; the centre span at point of suspension is 347 feet; the side spans, 185 feet; the deflection of chains at centre is 29 feet; and at the sides, 30 feet 6 inches; the height of the roadway at towers above Trinity high-water mark is 24 feet 2 inches; the height in centre is 24 feet 6 inches; and at the abutments, 23 feet; the clear headway above Trinity high-water mark is 21 feet 8 inches; at the abutments it is 20 feet 2 inches.

The piers upon which the towers are built are each 88 feet in length and 19 feet 3 inches in width, and terminate in curved cutwaters 7 feet 6 inches above the level of high-water mark. The foundations of these piers are similar to those which are being formed for the arches of new Westminster-bridge, and which were described very fully and defended by us at a time when opinion was running adverse.* They consist of timber piles driven into the London clay below the bed of the river at intervals of 3 feet over the entire area of the piers, and cut off at nearly low-water level. The outside of the piers is formed by cast-iron piles of 12 inches diameter and 27 feet long, driven 20 feet below low-water mark, and, between these, cast-iron plates are driven so as to protect on all sides the bearing piles by a metallic casing. The space thus enclosed is then dredged to the hard stratum of gravel above the clay, filled in with concrete, and the whole secured by wrought-iron tie-bars. On the bearing piles is a flooring of solid stone bedded on the concrete. All the caisson above low water is lined with brickwork, and the cutwaters at each end, where exposed to constant shocks from drifting vessels, are built of solid brickwork.

Each tower is formed of eight cast-iron hollow columns, 1 inch thick, connected by cross-frames, as shown in fig. 1. These columns, with spreading feet, go down to within 2 feet of low-water mark. The height from high-water mark to the point of suspension of the lower chain is 59 feet 6 inches, namely, 7 feet 6 inches from high-water mark to the platform, and 52 feet from the platform to the underside of the lower chain.

The sectional area of the chains at the centre of the bridge is 212 square inches, which gradually increases in proportion to the strain, towards the towers, where it is 226. The suspension rods passing from the chains to the roadway of the bridge are 2 inches in diameter, and placed 8 feet apart. They have a joint at each extremity, the upper one allowing a motion parallel with the chains, and the lower a transverse motion. The roadway has a rise of 18 inches from the land moorings to the centre. Two wrought-iron longitudinal lattice girders (as described in our first account) extend the entire length of the bridge, and are secured to the suspension-rods to which the transverse girders supporting the carriageway are also bolted. These girders are eighty-seven in number. They are formed of boiler-plate, strengthened with angle iron, and are 32 feet long by 2 feet 8 inches deep, and weigh 32 cwt. each. Between these girders pass wrought-iron bearings, to which are bolted plates of iron of the same material which forms the roadway. On the upper surface these plates are covered with bitumen, over which are laid compressed slabs of asphalte and cork cuttings. This forms the bed for a wood pavement of blocks of ship oak, which are again coated over with asphalte and the paved surface of the road completed.

The bridge was designed and is being carried out by Mr. Thomas Page. Mr. R. A. Rumble is the resident inspector; Messrs. Young and Co. are the contractors.

We may add, that Messrs. Howard and Ravenhill, of Rotherhithe, have executed all the chains, suspending-rods, and plates, and that these have borne the severe test of a tensile strain of 13½ tons per inch, without yielding $\frac{1}{150}$th of an inch to a foot, and that the work is very satisfactory.

* For diagrams see vol. xiv. p. 466.

So far as respects the design, artistically considered, we must confess to having no admiration for the termination of the piers, although the globe, we are told, is to be of glass; and as to the toll-houses, now nearly finished, we should seriously advise an alteration: they are not worthy of the important construction to which they are the preface.

The annexed details will make our account clearer.

Fig. 1 is a section through pier, showing the foundation of the iron columns.

Fig. 2, section of half the roadway.

Fig. 3 shows the anchorage of the suspending-chains.

Figs. 4, 5, 6, and 7, show the arrangements of the chains at the point of suspension, with the rollers beneath.

Fig. 8, the joint of the suspension-rods.

OLD SEWERS A LATENT SOURCE OF DISEASE.

All modern houses are built upon a system, which by a little precaution, and a scarcely appreciable expense, affords at the same time health and comfort to the occupant. A very few years back, no provision whatever was made to guard against the absorption of moisture in the foundation walls of a house; latterly, every working bricklayer knows, that by the use of a single layer of slate (fixed in cement), ever so little above the ground range of a foundation, the rise of damp in walls is repressed.

What a catalogue of evils is avoided by this simple provision! The servants of an establishment are saved from all the penalties which *damp walls* are sure to entail upon the occupant of a basement story; all the aches to which the human constitution is subject are at once obviated; and apartments which, built on the surface, were formerly damp some 2 or 3 feet upward; or if sunken only 4 feet below the level, were damp to the ceiling, are now perfectly dry, and fit for sleeping-rooms.

The evil of damp walls is, however, but a small matter when contrasted with other abominations, reliques—no, we cannot say of barbarous times,—but of the little regard which was paid by builders of only twenty years back to the easements required for every human habitation. The most important consideration in founding a structure, after the general plans are decided, is the proper disposition, arrangement, and formation of the sewers: the first postulate is a sufficient fall; the second, the due allocation of sinks and traps; the third, the proper and solid conformation of the duct whereby the sullage is conveyed to the main or public sewer.

Until very recently, the house-drain was constructed in 4-inch brickwork, carried out throughout the whole covered area; the arch or covering was in the same gauge, formed of bats or place bricks, packed loosely together, with just as much mortar as might keep the whole mass in position, and then the whole system of house-drainage was covered in.

In process of time those drains, if well filled in with water, become solid, and as the phrase runs, water bound; in fact, the mortar of an old sewer is invariably harder than the brick—but there is an agency ever at work below the surface, against which it never entered into the heads of *speculative builders* to provide. The rats of London number millions, and their domain is the sewers; they occupy the street lines in strong colonies, and they make discursive visits into the tributaries; seeking their sustenance from the larders and waste of the circumjacent domiciles. They invade every house, and whilst the mortar is wet or green, they permeate the thin context of 4-inch brickwork; burrowing into every apartment, and making apertures through which the malignant and suppressed vapours of compound ordure ascend, and fill the mansion to the roof with the seeds of cholera. As water gravitates downward, those subtle vapours tend upwards; the pent-up malignities of 100 miles of sewer, being in a state of perpetual agitation to find vent upwards, thus fill with malaria the chambers which they were formed to disinfect.

In many, not very old soccages, *and even in good squares*, the stench emanating from the sewers, is at times so rank, so overpowering, and so læthal, that the tenant would be justified in throwing up his occupancy, on the plea of danger to the health of his family. To tamper with such imperfect drains, or to endeavour to cobble them up, is wholly useless. You may find out a dozen rat-holes, and cement them; you may open out the external areas, and clear the traps; but all is in vain. The entire system is diseased, and pregnant with infection—it is open at every chink, therefore the only remedy is to clear away the whole original system, and to lay down in place thereof non-absorbent tubular drain-pipes, well luted together at the joints with properly attempered mortar. The confined and sublimated vapours ooze through the brickwork, but drain-pipes are impermeable.

By thus providing for security against damp in basement walls, and by simply using the proper conduit for house sewage, every ground or sunken floor of the metropolis may be rendered wholesome, comfortable, and clean.

Meanwhile, a *visitation from house to house*, to look after these matters, is seriously incumbent on parish authorities. Whilst they inspect external sewers, decayed house-drains are in equal need of revision. Q.

HARROW REVISITED.

It is gratifying to find that the authorities of all our public schools do not stand stock still. It is wise to advance with the times, and keep pace with the progress of the age. Harrow is in the hands of improvers: the builders have been busy, and are busy now; and, what is more, they have contrived to mix the useful with the ornamental. As usual in all such cases, a critic might find food for his unamiable allowance of grumbling,—to show his learning; for critics always assume to themselves the privilege of knowing more than anybody else. Stark criticism is not my business: it is simply to describe what I saw of the actual state of things in the famous village;—such an odd, quaint, dear little up and down, in and out village, as it is, with its queer nooks and corners, little houses, and wire-clad windows.

The old village is getting quite juvenile, quite fresh and perky, and, like ladies past a certain age, has begun to smarten itself up, and disguise its many cracks and wrinkles. What with additions and demolitions, it has become more smart, more gay and jaunty, than it used to be,—in my juvenile days. A few years have made many changes, and certainly for the better: much has been done, but not too much, in the way of alteration. After a few years' rambling over many strange lands, we find great changes when we return to our old haunts. Whole generations of juveniles have come and gone, passed through the dingy portals of the old school, and entered into the rough and stormy paths of life; but the weather-beaten school-house stands bravely where it did, and the old church—such a rare old church,—still crowns the hill,—with a new face to be sure, but proud of its hoar antiquity, and, may be, proud of its smart new dressing.

The old turnpike-house has gone,—clean disappeared, with its odd chimney and queer quaint gables: although it may be missed, it is no loss; but yet it is an ancient landmark swept away, and more than one weather-beaten wooden house has followed in its wake,—by this time burnt for firewood: peace to their ashes. The old sign at the "King's Head" still swings in its gibbet, and creaks as shrill as ever on its rusty hinges. The house itself has been smitten with the prevailing taste for change: the two queer little parlours have been knocked into one—actually into one room,—smartened up with new sashes, and squares of coloured glass, the artistic production of the most eminent glazier of the village.

Mine host and his artist friend, the glazier, are proud of the effect of their joint labours. They have put in new glass, but knocked out many a reminiscence by so doing: many a well-remembered name scrawled on the ancient squares has gone for ever,—like the noble fellows who scratched them on the frail and brittle glass.

A few, very few days since, I read in the melancholy columns of our Indian news the death of as fine a fellow as ever drew sabre in defence of the honour of our brave old flag. I searched for the well-remembered square where I saw him scratch his name, but alas! like himself, it has gone. Oh, mine host of the old "King's Head," may the gods forgive you, for I cannot.

And why has mine host thrown these two old rooms of his into one? Because the master of the school was going to give a dinner to the inhabitants of the village, in commemoration of the erection of new school-rooms and the new memorial chapel. Good,—the occasion is good, the cause is good; but, master landlord and glazier, you have demolished what you can never replace. Give your sign a new face, repaint "bluff Hall," if you will; but you should have left these scribbled squares of glass for the sake of the names they bore, and for the men who scratched them there. Time-honoured names of brave men were on those squares of thine, mine host; but they are gone. The old church has been smartened up, the time-eaten walls cased with a new coat, not of "rough cast," thank goodness: let us hope the church menders have for once done what they ought to have done, although perhaps they may also have done what they ought not to have done. They have improved the church inside and out, therefore let us give them thanks; for it is not one of the usual churchwarden's blotches,—it will pass muster very well; and, as I am not critically disposed, I will not write a critique.

There is one "restoration" in the church which

gladdened my eyes: it was to see the time-worn monumental brass of the founder of the school rescued from its old position, saved from the nailed boots of the villagers, and now fixed in a pillar in a conspicuous part of the church. It was grievous to see the brazen effigy of the generous founder of the noble school so utterly disregarded as to form part of the pavement of a pew, daily trampled underfoot, and effaced by the feet of our village friends, who owe everything to the man whose monument they so scurvily treated.

Surely this is a sign we live in better times. The monumental brass of the founder of Harrow School has at length been thought worthy of a place of safety in the church where he so often worshipped. Romans, countrymen, and friends, I thank you for your justice, though 'tis but tardy and long withheld.

The old font too,—what strange vicissitudes it has seen: once the ornament of the church; then the ornament of a little garden; then the receptacle for boots and shoes, blacking-brushes, and rubbish of that kind,—to say nothing of bath bricks and hearth-stones. It is strange, but true, that this venerable piece of antiquity—a quaint old font of Purbeck marble—was turned out of the church, vilely abused for many years, and at last re-polished and restored to its proper place in the old church, from which it had been removed, doubtless, by the hands of some long since defunct improving churchwarden.

It used to grieve me much to see this old font filled with dirty boots and shoes instead of holy water. I often raised my voice, but in vain. I have at last had the satisfaction to see the font restored, as well as the founder's brass; so let us hope that the worthy people of the village have satisfied their consciences, and done at last what ought to have been done many years ago.

They did well when they saved this venerable font; and so did I; for when it was in the course of restoration I preserved a chip to convert into a seal, which has travelled many a weary mile with me over sea and land in many and varied climes.

It will be gratifying to all true Harrovians to know that the monumental brass of old Lyon, the founder of the school, has, after many years of vile abuse and shameful neglect, been carefully preserved in a slab on one of the pillars of the church. Could old Lyon have risen from his grave, he would have shaken his bony fist in the pale faces of the authorities of the school for their neglect of his monument, and he would have said, in a voice of thunder—

> "Exegi monumentum ære perennius,
> Regalique situ pyramidum altius:
> Quod non imber edax, non Aquilo impotens
> Possit diruere, aut innumerabilis
> Annorum series, et fuga temporum."

Of the old school-house nothing need be said here as it remains much the same, untouched by any one, and gently used by Time himself. It looks down complacently on the new wonders springing up at its feet, and long may it do so.

The school chapel has been pulled down—quite a recent building—to make room for the new memorial chapel now in course of completion, and but recently consecrated.

Side by side with the new chapel is also a new school-house, built entirely of very red bricks, to correspond in some measure with the venerable front of the old school.

These new class-rooms are a great addition, not only to the architectural appearance of the village, but to the convenience of any one connected with the school. It is a simple, unpretending building, not at all burdened with decorations, being evidently built more for use than ornament: it has a quaint air of douce utility, more formal than elegant; and, if not picturesque, it has the merit of being neither out of character nor unsightly—negative virtues, but virtues after all.

If it claim the merit of harmonising with the old school, and being in character with the head-master's residence, it has at the same time the privilege of being in rather violent contrast with the florid ornamentation, and white stone dressings of the new Memorial Chapel—however, variety is pleasing—and here, certainly, we have both variety and contrasting edifices, placed side by side to claim attention from those who are critically disposed, which I am not.

The new chapel is totally different in style, character, and general feature, from anything else in the old village, and bids fair to be one more lion added to the rustic wonders of the place. It is a building of considerable size for a school chapel, and of considerable pretension as well,—as, indeed, it ought to be under the circumstances of its erection.

It has been raised for a twofold purpose, as a school chapel for the boys, and to commemorate the memory of those gallant Harrovians who perished in the Crimean war.

It has ornamented seats, brass lamps, and will, it is hoped, be filled with stained-glass windows; one of which is already in its place, and others are in preparation. The steeple is not yet complete, nor indeed are all the external or internal decorations.

It is a great addition to the architectural features of the little village, and will, undoubtedly, be a centre of attraction for the numerous visitors to Harrow. It might have been placed in a better position; but then it might have been placed in a worse—so we are quits with criticism on this head.

The names of those heroic Harrovians who fell in the Crimean war will be emblazoned in a conspicuous place in the chapel—the last tribute which the living can pay to the dead—there, let us hope, to remain, not only in memory of the fallen brave, who nobly did their duty in the hour of need, but at the same time to set an example of courage and devotion, of deeds nobly dared, and victories won, to the numerous generation of young and generous hearts, having this memorial constantly before them while enjoying the sunny morn of life, and passing through the school—to fit themselves for similar honours, when they may pass away—for it is something, after all, to leave an honoured name behind.

But let us descend the hill and cross a noble meadow down to *Duck Puddle*—"Oh Phœbus, what a name!"—and cast a glance at the grand improvements effected in the bathing-place. A few years back this was a mere muddy pond, good enough for pigs to wallow in, but scarcely adapted for the purpose for which it was intended; for, *certes*, the bathers often came out more like "*little pigs than gentlemen*." Now, however, all is changed. The bathing-place has been paved, bricked, and slated, lined round with dressing sheds, and what is of more consequence, supplied with a running stream of clear water. This improvement is a decided step in the right direction, and if the water is not exactly equally clear with the limpid stream of Bandusia, or Father Thames at Eton, it is clear and wholesome, and of inestimable value to the boys. It is an improvement which merits notice and deserves our warmest approbation, for it has been the means of giving to Harrow School what Harrovians much wanted, a place where they can bathe in clean water. The boys are proud of "Duck Puddle" now, and so they ought to be, for the cost is money really well spent.

Besides these alterations and improvements the new racquet-grounds must not be overlooked. They are conveniently placed, and are a useful addition to the necessary equipments of a great public school, where ample accommodation is required for all kinds of manly games.

While on the subject of these improvements, it has occurred to us that something not only might be done, but ought really to be done, to improve the little dingy room dignified with the name of the Library. A great public school like Harrow ought to have not only a better room but a better library than it has at present. In this respect Harrow is far behind its rival, Eton; and now that the school is well up in numbers as well as in reputation, we hope the "Harrow gentlemen" of the present and future generations will put their shoulders to the wheel and make a stir, not only to moot the question of a better library and more suitable room, but will set to work in earnest, and at least take one step more in the right direction, and get up a library worthy of the name and reputation of the brave old school. It would soon be furnished by presents from "old fellows," and in a few years would assume proportions worthy of the standing which Harrow has acquired in the list of our public schools.

This hasty and rambling sketch might be much extended, the subject being anything but exhausted; and, before closing, it may be well to add that the authorities have shown great wisdom, and some liberality, in providing a suitable place for the children of the inhabitants of the old village. This is wise, for they have great and undoubted claims to share the benefits of Lyon's noble legacy to the inhabitants of Harrow.

What changes we find after a few years' absence from any place! Here at Harrow is the "old 'pike" demolished, the old church restored inside and out, the founder's old monumental brass carefully restored, the new chapel pulled down to make room for a newer, and dear dirty old Duck Puddle is a puddle no longer. Old houses knocked down and new ones run up, old faces gone, and old friends after them, and so on to the end of the chapter, a clear and convincing proof, ye gentlemen of Harrow, that the longer we live the older we get. Amen. L.

Mr. Ottley's Lectures on Painters and Painting.—On Wednesday last, Mr. Ottley, formerly art critic on the *Morning Chronicle*, delivered the second of a series of Lectures on Painters and Painting, as illustrated in the works of Michelangelo, Titian, Raffaelle, and Corregio, &c. The Lecture, which was delivered in an interesting and masterly manner, commanded the applause of those present.

PROVINCIAL NEWS.

Ipswich.—Mr. Bruff's plan for the complete sewerage of this town has been brought under the special consideration of the town council. The plan recommended, instead of the concentrated pumping system before proposed, the use of the river as the natural outfall, by constructing a sewer on each bank, to be discharged at certain points below the town, the mouth of each sewer being tide-flapped, so as to discharge the sewage freely for eight hours, and partially for five hours each day, and to store it during the remainder of the day. The total estimated cost was 30,000*l.* which the committee recommended should be raised in eight years by rates. The recommendation of the committee was adopted by sixteen to eight.

Misterton (Leicestershire).—The esquire of this place, with his brother, the Rev. G. H. Franks, rector, are erecting schools at their own cost. They consist of a boys' and girls' school, with residence attached, and an infant school, with class-rooms to each school, porches, lavatory, and out-buildings, the whole forming one group, situated in a pleasant meadow, well backed with woodland. The buildings are erecting in the native material, red brick being varied with grey-ended bricks, the windows all of stone; the style that of the fourteenth century, but very simple. The work is proceeding under the superintendence of Mr. Teulon. Messrs. Laws, of Lutterworth, are the contractors.

Guildford.—The alterations and additions to the union workhouse, commenced last autumn, are now completed. The new buildings comprise schools for 150 children, a fever hospital, additional wards for male and female paupers, alterations to the old infirmary, a new lying-in ward, &c. The school buildings contain two large school-rooms, two dining-halls, dormitories, sitting-rooms and bed-rooms for the schoolmaster and schoolmistress, with lavatories, bath-rooms, &c. On the boys' side are two work-rooms for industrial training, and on the girls' a laundry. All the rooms are lofty, and well lighted and ventilated. The schools and playgrounds are detached from the main building, with the view of separating the children from the adult paupers. The new hospital, which is also placed at some distance from the other buildings, in order to prevent infection, contains three wards for male patients, and the same number for female patients, with nurse's room, bath-rooms, &c. Great pains have been taken to secure perfect ventilation in the wards of the new hospital, and to improve the ventilation in the old infirmary, which originally was extremely defective. A new workroom has been erected for dissolute women, and new rooms provided for the aged and able-bodied men and women. The works have been executed by Mr. O. S. Ellis, from the designs and under the superintendence of the architect, Mr. C. H. Howell. The amount of the contract was 5,947*l.* and the actual cost of the works 5,938*l.*

Tewkesbury.—The Corn Exchange at Tewkesbury has been inaugurated. The new building has been erected on the vacant space in front of the Townhall, and forms part of it. The front, which is of stone, is of the Doric order. The plinth is of Stanway Hill stone, forming a contrast in colour to the Bath stone above. Two three-quarter columns and two antæ divide the front, between which are placed two windows and the door. The roof is of wood and iron, in three spans, the centre being of glass, supported by trussed girders. The contractors were Messrs. Collins and Knight. The front shows some sculpture designed and executed by Mr. H. Frith, of Gloucester. The total cost of the building is about 700*l.*

Tenbury.—The first stone of a Corn Exchange and public building has been laid at Tenbury, in Worcestershire.

Swansea.—New schools are being erected at the Cockitt, Swansea. Plans being prepared by Mr. R. Kyrke Penson, the diocesan architect, application was made to the Educational Board of the Privy Council, who made a grant of 350*l.* towards defraying the cost. The remainder is private subscriptions, partly obtained. The committee having advertised for tenders, several were sent in, and the tender of Messrs. David Evans and William Roberts, being the lowest, was accepted. The building will consist of two school-rooms, one for boys and one for girls, with separate entrances and lobbies, a class-room, and a residence for the master. The size of each school-room is 27 feet by 18 feet, and the class-room 15 feet by 16 feet. There will thus be afforded accommodation for 150 children. The cost of schools, residence, boundary-walls, &c. will be about 700*l.* The building will of necessity be plain in character, but so far corresponding in appearance with the recently-erected church for the vicar.

Preston.—Messrs. Cooper and Tullis, masons and builders, of this town, says the *Preston Guardian*, have just completed the construction of a new wing at Fulwood-barracks, which is designed for the accom-

modation of married soldiers and their wives. The site is at the north-east end of the cavalry barracks, at the extreme end, the dwellings in front facing the exercise-ground. The entire range of tenements is 111 yards long, and 33 feet wide, with a flagged parapet all round, three yards in width. There are ten divisions, eight dwellings or compartments in each; and thus accommodation is provided for eighty soldiers and their wives. There is no attempt at ornamentation in the architecture. The walls inside are of brick, and externally the building is constructed of hammer-dressed Longridge stone. The building is two stories in height. Behind and in a line with the dwellings are a wash-house, drying-room, laundry, and other necessary appurtenances, all of stone. The stairs are of oak, and the floors of Baltic timber an inch and a half thick, with oak joists. Mr. J. Whitehead executed the ironwork, and Messrs. Wilding and Watson the plumbing, glazing, and painting. The cost has been 8,520*l.* The entire amount expended in the barracks at Fulwood is 145,520*l.*

CHURCH-BUILDING NEWS.

Little Addington.—The church of Little Addington has been restored and re-opened. The roofing has been renewed, and the church re-seated. The tower, which is at the west end of the nave, and within the body of the church, was originally open on the north, south, and east sides. For many years the arches and piers which supported those three sides were hidden from view by being built up, and an unsightly gallery placed at the west end of the church. This gallery has been removed, and the three arches opened and restored. A groined ceiling in the north porch has been restored, and the plastering removed. The old oak pulpit and the chancel screen have been preserved and restored, these being the only two specimens of ancient woodwork in the church. It is to be hoped the chancel will soon be new roofed and restored. The restorations have been executed under the superintendence of Mr. E. F. Law, of Northampton, architect.

Harrogate.—St. John's church and burial-ground, Bilton, near High Harrogate, have been consecrated. Except the spire, which still remains unfinished, the church was completed in 1855, from the designs of Mr. Scott, since which time it has been used as a chapel of ease. It is built of dressed stone, and is covered in with blue slate. The style is Early English, and the site commands an extensive and picturesque view of the valley of the Nidd and the surrounding country. The interior is divided into nave, side aisles, and chancel, the aisles being separated from the nave by five arches, supported by clustered columns, the capitals of which are richly decorated with vine-leaves and fruit. The windows are lancet-shaped, the lower tier in the aisles being single lights, and the upper tier in the nave double lights, the whole being glazed with glass of a slightly green colour. In addition to the east window, with three lights, the chancel is lighted by two single-light windows on the north, and two on the south side, the whole being stained. The east window is from the *atelier* of Mr. Crace, of London, the subject including the principal events in the life of Christ. The north windows, representing events in the ministration of Christ, are from the works of Mr. Ward, of London; and the south are by Mr. Clutterbuck, the subjects being St. John the Baptist and St. John the Evangelist. The timbers of the roof are varnished. The church has been erected, at a cost to Mr. Sheepshanks, of Leeds, of between 9,000*l.* and 10,000*l.*

Dorchester.—The Congregational church in South-street has been opened. In style it is Decorated Gothic, executed from a design by Messrs. Poulton and Woodman, of Reading, in random walling of Ridgway stone, with Bath stone dressings. The front is ornamental, with a traceried window and gable, with finial over it. On each side is a porch, the south forming the base of the spire. This latter is of Bath stone, springing from light open tracery work. The dimensions of the body of the church are 76 feet by 37 feet, and the form is a parallelogram, with vestries and a school-house in the rear. The school-house is about 40 feet by 32 feet. The church, in the interior, is ceiled, but in the open-timbered roof form. The seats are low, and of stained deal, and will accommodate 600 persons. The floor is of Poole Pottery tiles. The window at the rear is of stained glass, by Mr. Lavers, of London. The pulpit platform is of Caen stone, and is surrounded with ornamental ironwork, decorated with gold and ultramarine. The edifice is warmed by Haden's hot-air apparatus, and lighted at night by two gaseliers. Mr. Wellspring, of Dorchester, was the contractor.

Brighton. — The enlargement of London-road chapel, and the schools adjoining it, undertaken at a cost of 1,500*l.* has been completed. The size of the chapel is doubled: it now holds 1,000 persons. No alteration has been made in the style of the edifice. The roof has been raised, and left open. A gallery now runs entirely round the chapel, supported on slight iron pillars. The pews are low benches. The architect for the alterations was Mr. Simpson, of Brighton; the contractors, Messrs. Wisden and Auscombe. In close proximity with the chapel a new Sunday-school, unpretending in character, has sprung up, built by Messrs. Goddard and Blaker. This holds 300 children. It opens into the infant school, held daily, for 260 children. A sum of 800*l.* has been subscribed, leaving 700*l.* still due.

Goldsborough. — The rector has uncovered some recesses of architectural work in the chancel of Goldsborough church, which had been plastered over for ages. Goldsborough church is called a specimen of the early Norman style, and contains two effigies of Crusaders in full panoply, said to have been the companions of Robert Curthose, in fighting the Paynim host on the plains of the East. Their descendants are labourers in the village at the present day.

THE STAINED GLASS FOR GLASGOW CATHEDRAL.

I AM very glad to observe, from the *Builder*, that the decoration of Glasgow Cathedral with stained glass is now exciting some degree of interest in England, and that it has recently formed the subject of discussion at the meeting of two architectural societies. I am also happy to observe that on both these occasions the decision of the committee was condemned. It has all along been consistently and vigorously opposed by the architects of Glasgow, who have taken active, and, I believe, effectual measures to prevent the resolution of the committee from being carried into effect.

The power of the committee to determine anything at all is not recognised by Government; and I am quite convinced that Sir Benjamin Hall is by no means satisfied with the result of their deliberations, and that he will never consent to the course they recommend or sanction such a ridiculous libel on British art: so that, upon the whole, the probability is, that the resolution of the committee will become a dead letter.

I trust, however, that the matter will yet be more generally taken up by architectural societies throughout the country. Here, unfortunately, we are in a very bad position for bringing anything of the kind before the public. We have no such thing as a professional *organ* in Scotland. Moreover, our architectural society—the Institute—is virtually defunct here: only two meetings were attempted last session, and they were both miserable failures. This is owing to a misunderstanding with our Edinburgh brethren.

As to the removal of the stained glass windows from the crypt: the windows—specimens of the Munich school—are unsuited for the position they occupy, and, in my humble opinion, the sooner they are out of it the better. GLASGOW.

STAINED GLASS.

St. Mark's Church, Whitechapel.—Five lofty lancets, subscribed for by the congregation, have just been erected in the chancel. They are geometrical, and contain eight medallions of subjects from the life of our Lord. Mr. Warrington was the artist.

St. Nicholas's Church, Liverpool.—The same artist has recently done for this edifice four north aisle windows, Perpendicular pictorial. Two of them are Crimean memorials to the rector's son, one a memorial to a late rector, the other to a merchant.

Childwall Church, near Liverpool.—A window has also been put up by Mr. Warrington in the north transept of this church. It is decorated, and is a memorial subject window to a Liverpool merchant's wife. This makes, with the east window, the fourth window the artist has done in this church, and he is now about decorating the entire transept for the same gentleman, and also painting a mural memorial in a window, of which the blank tracery is inside, for the vicar.

St. Matthew's, Stoke Newington.—A memorial window was erected on the eve of All Saints, in the south side of the aisle of St. Matthew's Church, Stoke Newington, consisting, in its stonework, of three main lights, and a large quatrefoil, the centre one of the three lights filled with grisaille diapered painted glass, with bands of colour, and coloured centre bosses: in the upper parts of the two side lights are figures of SS. Peter and Paul: beneath these are panels of diapered glass, having in their centres medallions, into which are worked the initials of those by whom the memorial has been erected. The large upper quatrefoil has a picture of the subject of "Our Lord's Agony in the Garden," and "The Sleeping Apostles." The window was designed and executed by Messrs. M. and A. O'Connor.

St. Michael's, Coventry.—The memorial window to the late Colonel the Hon. F. G. Hood, in this church, has just been completed. Beneath the window is engraved the following inscription:—"To the honour and glory of God, and in memory of Colonel the Hon. Francis Grosvenor Hood, who commanded the Grenadier Guards at the battle of the Alma, September 20, 1854, and fell in the trenches before Sebastopol, October 18, 1854, aged 45;—this window was erected by the inhabitants of this city and neighbourhood."

St. Mary's, Bury.—A new painted window has been put into the east end of the north aisle of this church, by Mr. Edward Greene, to the memory of the late Mrs. Greene. The window consists of three lights, each of which contains two subjects, the upper one being the Old Testament type of the Gospel incident portrayed on the lower. The subjects are:—1. "The Gathering of the Manna," with the legend, "Your fathers did eat manna, and are dead;" and below, "The Last Supper," with, "I am the living bread which cometh down from Heaven." 2. "The Serpent in the Wilderness;"—"As Moses lifted up the serpent in the wilderness;" the lower subject representing, "Our Lord and Nicodemus," with the inscription, "So must the Son of Man be lifted up." And, 3. "The Dividing of the Waters of the Red Sea;"—"The fathers were baptised unto Moses in the sea;" below which is "The Baptism of Christ," with legend, "As many as have been baptised into Christ have put on Christ." The small lights in the tracery at the top of the window contain angels holding scrolls and the sacred monogram; and the spaces between the upper and lower line of subjects contain the symbolical pelican, the Alpha and Omega, and the Agnus Dei. The rest of the window is filled in with diaper and border work of leaves and flowers. The work has been executed by Messrs. Heaton and Butler, to whose hands the west window of the nave has been entrusted.

LONDON SEWAGE CONVEYED BY HYDROSTATIC PRESSURE.

I WAS greatly pleased with the short notice of Mr. Lipscombe's proposal for conveying sewage to the sea, which appeared in your number of the 7th inst. If I do not greatly mistake, he has hit upon the solution of one of the great questions of the day; and I have the more confidence in the success of his plans because (though I do not mean to dispute his patent, as I confess I never thought of applying the principle on a large scale) your account of them immediately reminded me of an application of his method which I had in operation for some years at a former residence of my own.

I was an ardent agriculturist, and therefore determined not to waste the sewage from my house; but as it was built in a low situation,—so much so that in time of flood the stream which ran through the grounds came almost into the back premises,—I had to devise a method for conveying the precious fluid to a tank sufficiently distant not to be offensive, and to be near the land to which I wished to apply it. After conning over the want of fall, which precluded any ordinary method of proceeding, it struck me that I had a head of water at an elevation of some 12 or 14 feet in the upstairs closets. I therefore determined to have a tank made, lined with brick set in cement, from the upper margin of which I carried a line of clay-pipes, well socketed into each other, for some hundreds of yards, beneath buildings, &c. till they terminated at the bottom of the discharge soil-pipe of the closets, which was of lead, and which was well secured into the end of the line of horizontal clay-pipes.

My proceedings were openly ridiculed by the workmen employed. They wanted to build a great barrel-drain of a foot in diameter, which would inevitably have been clogged up with the stagnant filth, whereas my pipes were only 3 inches (I think) in diameter! When all was ready, and the work dry, I had the ground left open, to see if any leakage occurred at the joints: all prophesied that such small pipes would be sure to be choked up, and the stuff would never reach the outfall into the tank, &c. which was on a dead level, and I believe actually rather up-hill. However, I had confidence in the pressure of fluids equally in all directions; and it was not belied; for, after repeatedly emptying the pans of the closets, and having all the slops poured down, at last I had the gratification of seeing the fluid begin to discharge itself into the tank. After a few trifling defects in some of the joints had been repaired with Roman cement, all was covered with earth, and for years a perfect drainage into my tank went on without disturbance from rats or any symptoms of choking; though other larger drains, from the scullery, &c. had repeatedly to be repaired.

Now, this little experiment really was a trial on a very small scale of the plan by which, as I understand it, Mr. Lipscombe proposes to do what so many long

heads have been puzzling over these several years, in reference to the drainage of the metropolis; and, as far as those parts are concerned situated at a certain elevation above the sea level, I have the greatest confidence in the idea. As to those parts at a very low level, I presume he would raise the sewage by steam power to reservoirs at a sufficient elevation; or perhaps force it at once through the pipes, as Mr. Mechi does at his farm, by forcing pumps.

Should means of profitably applying sewage on a large scale to agriculture be devised, it is evident that, by ramifications of pipes in all directions from the mains, it may be conveyed to a large extent of country, just as a water company supplies houses and streets from its mains under hydrostatic pressure. Depend upon it, sir, it is a fertile principle.

HYDRODYNAMICS.

THE BRAINTREE CEMETERY CASE.

ERRONEOUS QUANTITIES.

THE following was received from the contractor before the appearance of our last number:—

With regard to the matter of the Board identifying themselves with the sale of the bills of quantities, I have to say that I bought my copy of Mr. Cunnington, the clerk of the Board, and paid him one guinea for it. Further, on there being an alteration in the plans to reduce the first estimates, I received a written copy of altered quantities from the clerk of the Board, which was accompanied by the following letter:—

"I am directed by the Braintree Burial Board to inform you that they have determined upon certain alterations in the work tendered for by you on the 24th September, 1855, and that their architect has prepared a new bill of quantities (of which I enclose a copy), consequent on such alterations." * * *

This letter having been sent to each party originally tendering, shows that the Board ordered the architect to prepare the quantities; that the clerk (the Board's servant) sold them; and also it recognises that all our estimates were based upon these bills of quantities.

By your quotations from the letter of S. Courtauld, esq. (chairman of the vestry meeting), you have fully shown the ground upon which the Board deny the power of the architect to certify, viz.—that they have not attached their official seal to the contract, which the clerk of the Board induced me to sign. At this very time he was acting as solicitor between myself and the Board; and having signed the contract, I trusted him to affix their seal, thinking of course that as an honest lawyer he would see them do it. Had I not implicitly left it to him, I should not have been duped by signing what the other party did not sign, nor should I have thus placed myself in a legally worse position to obtain ready payment for that part of the debt which they all admit to be just.

As to my being aware that the risk of the quantities was mine, you will see by the architect's letter that he was *positive* they were correct, while I only *suspected* they were not. Besides, it was because I had done two hundred pounds' worth of work, and the clerk asserted I should have no claim for it till the contract was executed, that I signed it. I preferred to risk the lesser amount to the greater; but the Board has almost reversed my choice by deliberately refusing to pay that part of my bill which they confess to owe. * * *

As you correctly observe, the strong point in my case is that the architect has certified the correctness of my claim, and has even explained the different items of my bill to the Board. But the solicitors to the Board exclaim, "We do not recognise an architect, for our seal is not upon the contract, which makes him umpire and his *decision final without appeal*."

Perhaps it is not for me to comment on the moral rectitude of such a defence. I only aver that I trusted the Board as a body of honourable men, and therefore, at the suggestion of the chairman and the clerk of the Board, agreed to try the claim for the 60*l.* for extra stone, as a friendly suit, in the County Court, never expecting to be entrapped into the unpleasant position of plaintiff in an action where legal technicalities were allowed to outweigh justice, and where gentlemen would undertake to defend that part of a debt (96*l.*) which, out of court, and even before the whole parish in vestry assembled, they acknowledged to be righteous.

November 9th. JAMES BROWN.

IN consequence of a letter appearing in your publication of Saturday last (page 662), signed "A. Cunnington," I beg the favour of a small portion of your valuable space in reply to a statement in that letter. I allude to that part where he says "the Board contends that the bills of quantities were prepared by the architect, and *sold by him for his own profit*." This I deny. The quantities were prepared by me in consequence of having a direct order from the Board to do so, and who also authorised them to be sold at one guinea a copy; two copies were sold by the Board or their representative (one of which copies Mr. Brown had), and three by myself; the total proceeds of the sale being five guineas. The lowest tender delivered for the works was 1,160*l.* upon which the usual per centage, if it be charged, would be about 17*l.* The time of myself and clerk in preparing the quantities was five days (they being executed in anastatic printing), besides paying for printing and carriage, 2*l.*; but, instead of my charging the Board upon either of the above principles, which I should be justified in doing, I am content to take the proceeds of the sale as remuneration for my trouble and money out of pocket. It will, therefore, be seen that the words, "*sold by him for his own profit*," is not a fact, and might very well have been left out of Mr. Cunnington's communication.

Nov. 16. J. JOHNSON, Architect.

METROPOLITAN BOARD OF WORKS.

THE MAIN DRAINAGE.

AT a meeting of the Board held on Monday last, 16th, Mr. Thwaites in the chair, it was resolved, by twenty-eight to three, on the motion of Mr. Bristow, seconded by Mr. Carpmael,—

"That this Board, having taken into consideration the interview between its chairman and officers and Her Majesty's First Commissioner of Works and his referees on the 5th of November inst., reiterates its conviction that to extend the point of outfall from B* to Sea Reach at the cost of the metropolitan ratepayers would be unjust, and in direct contravention of the principles of the Metropolis Local Management Act."

The discussion displayed considerable ability and common sense, and would serve to give a better impression as to the character of the Board than is entertained by some.

INSTITUTION OF CIVIL ENGINEERS.

LIGHTING MINES BY GAS.

THE first meeting of the new session, held on the 10th inst. Mr. Robert Stephenson, M.P. president, in the chair, was occupied by receiving a paper "On Lighting Mines by Gas," by Mr. Alexander Wright.

The paper commenced by noticing the almost universal introduction of gas for the purpose of illumination, and the causes of the attention of the author being turned to its adaptation to the lighting of mines, where the present mode of employing tallow-candles, or oil-lamps, was found to be prejudicial to the health of the miners, whilst the light afforded was so inadequate, that men could not perform their duty properly. It was stated, that the expenditure of oil and tallow in the mines of England might be roughly estimated at 500,000*l.* per annum.

In Cornwall and Devon alone there were about 30,000 men employed underground, who were lighted at an annual expense of 90,000*l.* per annum; and in one of the large mines the annual expenditure for candles had reached as high as 7,000*l.*

A general review of the state of lighting and ventilation of the Cornish mines induced the attention of the author to the introduction of gas for superseding candles and oil-lamps. An attempt had been previously made at the Tresevean mine in Gwennap, but it was abandoned. He concurred that it was preferable to make the trial upon a mine where explosive gases were not given off, as in coal-mines; and where the work was closer, and did not extend so rapidly.

The mine selected for the experiment was the Balleswidden mine: the depth of the shaft was described as being about 780 feet, whence there branched out several levels and tramways, at various depths, and in numerous directions. About 340 miners were employed underground, in two changes, or shifts, each of about eight hours' duration. Each man worked about five days during the week underground, and one day aboveground.

In the ordinary mode of lighting, each miner burned four candles in eight hours, obtaining only an inadequate light for the expense incurred.

The gas which was introduced to this mine was manufactured at the surface, and was forced by a pump into a heavy gas-holder, composed of cast-iron plates, whence it issued by a descending pipe into the mine, under a pressure equal to 18·7 inches of water. The shafts and levels were fitted with wrought-iron tubes, proved by high-pressure steam, and from the branches, flexible tubes and burners were carried into the pitches and chambers for the miners, and to the floors for picking the ore. The tramways, also, had a sufficient number of burners, to preclude the necessity for using any candles or lamps in the mine.

The quantity of gas consumed was about 4,000 cubic feet per day, of two shifts of miners.

The comparative expense of the two systems of lighting was stated to be much in favour of gas;—as the annual cost of candles was 834*l.* 3s. 4d.—whereas that of gas was 487*l.* 2s. including interest on plant, wear and tear, and all expenses.

It was stated that the sanitary condition of the mine was visibly improved: the ventilation was better, and there was an entire absence of the sickening smoke and bad odour, previously pervading the mine, which the author believed to arise from some particular compounds of hydrogen and carbon, given off during the imperfect combustion of the candles.*

THE VACANT SPACE NEAR ST. PAUL'S CATHEDRAL.

THE subject of the appropriation of this piece of ground was a few days since brought under the consideration of the corporation of the City of London; and, so far as might be gathered from the reports published in the morning papers, an evident desire seemed to be shown to preserve the space, which enables us to take the finest view that is to be had of this glorious structure—the "Pearl of the City." But then this peculiar spot of land, which, uncovered, displays so fine a picture, is worth 50,000*l.*—a large sum undoubtedly, but not more than the worth of the view which, by means of this opening, is offered to both foreign visitors and the people at home.

Some small paintings, by Correggio, and other famed artists, are worth from 10,000*l.* to 15,000*l.* each, and private individuals of taste are delighted to be in the possession of such treasures. If a single effort of the gifted pencil is worth about the quarter of fifty thousand pounds, how can we feel that this price is too much for the picture which is offered to the sight of the passer-by, from the eastern part of this opening? Moreover, it would be only doing a tardy act of justice to Sir Christopher Wren, now that an opportunity offers of displaying to some extent a work which is not only a credit to the architect, but to the nation. This noble building has been surrounded in all directions in a manner which must cause every one of sufficient knowledge to regret the taste of our forefathers.

Sir Christopher Wren hoped, when the City was in ruins, that he might have been permitted to remodel it—to make a terrace along the banks of "Father Thames," to form a magnificent flight of steps from the cathedral to the river, and to plan the streets of the new city in intersecting straight lines, which would have added not only to the health of the heart of the metropolis, but would have also given us the means of appreciating the merits of the exterior design of our chief cathedral. Unfortunately, however, pounds, shillings, and pence, and a strange perversity, caused the City to rise from the ashes in all the crooked and narrow ways which had been formed by circumstances, and under the necessity contingent with a large population lodged within defensive walls.

At the recent meeting at which this subject was considered, many strong arguments were used in favour of preserving the land, and but few on the contrary, except the bare money value of the property. With the large revenues of the corporation, although at present overdrawn by the expense of various important alterations, the sum above stated might be spared, and the next generation, and those that follow, will appreciate the taste and public spirit which caused the City authorities to leave them a fine view of St. Paul's.

It is to be hoped that those who have so ably advocated the preservation of this space, which is of such great value to the public, will make renewed exertions; and that at the next meeting we shall be told that the corporation have declined building here. Independently of other advantages, it would be a famous site for important public monuments.

GRAVEYARD SCULPTURE AND FUNEREAL POMP.

SOME months ago you kindly gave space in your columns to some remarks of mine, on the gross errors committed in a grammatical sense, or rather an orthographical one, by our sculptors of the various *mementos-mori* which disgrace and disfigure our cemeteries. To thank you for that favour is to acknowledge my obligations to you, for the public press, through you, multiplies the writer's views ten thousand fold.

Allow me, then, once again to refer to our "graveyards," now called "cemeteries." Generally they are placed in picturesque situations — they have all that the poetry of isolation, of green fields, and babbling brooks," or sunny hill sides, and extensive prospects, o'er hill and dale, can give to render such localities at once the fitting places for solitary grief,

* A paper was read at the meeting of Tuesday last, the 17th inst. "On the Conversion of Wood by Machinery," by Mr. G. L. Molesworth.

or of saddened and hallowing reflection. Why, then, it may be asked, are these sacred repositories shunned by the man of taste, the reflective, the pensive mind? Why? Because every feeling is offended, and every insult offered to the eye and the imagination. Under the garb of humility, you have the pompous slab of "departed greatness;" all the virtues are enrolled to tell how a man discharged the duties of life, whilst the notorious fact is concealed, that intoxication sapped, madness primed, and death fired the train, which resulted in an end rejoiced over by all, especially by "the sorrowing widow, and her weeping fatherless children." In more than one instance could I point out, in *every suburban cemetery*, cases where such inscriptions would show that—

"The fun'ral baked meats
Did joyful furnish forth the marriage tables;"

and all the grief that was real was displayed in paying—

"The hearse, the coach, the panoply of pride,
The graveyard sculptor,—would that he had died,
Ere such a bill as this was shown!"

Ay, and so say I, for I have come to the conclusion that epitaphs and all the parade of woe are a mockery, a delusion, and a snare. A poor family loses a relative, near, dear, distant, or uncared for; a pompous funeral is determined upon; the "Gothic" hearse is bespoke, the feathers and "all the mockeries of grief" are there. All wonder, admire, and in the end imitate, never reflecting on the cost,—never asking how the "fatherless" will be pinched to pay for the black plumes,—how many an empty stomach will protest against—

"The swilling Bacchanals, who drink success
To trade,"

and show the only sign of weeping in the drink-glazed eye.

I would ask of the *Builder* to denounce the whole of our existing system of burials and the after-death perpetuations. Do, pray, condemn the New-road style of mourning: let us, when we take a walk in our "graveyards" cease to be reminded that we are in the workshop of "Fitz-Humbug," or "Pretentious Brainless."

Departed greatness sleeps in modest rest. A horse-slaughterer, or a quack doctor, or any other sepulchral advertising knave, blazons fabulous qualities, and calls them virtues, and boasts of goodness where only hicanery, imposition, and impudence, deluded ignorance and enriched themselves on the follies of a generation. "Sufficient for their day was the evil thereof:" why are their heirs and successors to reap another harvest? is the question of your inquirer. Let the present generation show by their practice how they discountenance such pretensions, absurdities, and gross impositions.

A Walker among the Tombs.

FASHION IN THE WEST.

There are many strange phases of this metropolis, which strike the attentive observer, and few are more curious than the regular changes and observances which take place periodically in different neighbourhoods. Amongst these, it may be mentioned, that almost as soon as the primrose and wallflowers have superseded the crocus, a change comes over the appearance of the London buildings. In squares and streets numerous bodies of painters are at work, and iron work and stucco are freed from the town smoke, and clad in hues more in contrast with the budding shrubs and trees. At that time the large extent of the western fashionable neighbourhood is deserted of its population, and many places are as quiet as a country village. At the doors of large mansions, trusty porters and housekeepers loiter, undecked with plush or powder,—the window-shutters of dining and drawing rooms are closed,—the assistants of the west-end tradesmen have an easy time of it, and in many instances the principals are looking as anxiously for the return of summer as school-boys do for the arrival of the swallows.

It seems a strange inconsistency, and yet so custom wills it, that when the buds open in youngest and freshest beauty, and when bright greenery begins to clothe the fine form of nature in the country, it is the time for its votaries to rush from these sweet retreats, and seek shelter in the town. It is a Quixotic measure, however, to criticize fashion. As the painters and decorators complete their work, a busy scene of industry commences in the dwellings. The windows and shutters are opened to admit the fresh spring air—upholsterers are busy, and soon the balconies and windows become gay with choice flowers and plants, which perfume the air, and afford a pleasure to the pent-up Londoner which it is difficult to describe. As the spring advances, one by one the families reach the town; the sound of carriages begins to waken the quiet streets; and, by a gradual increase of arrivals, the "west-end," before the hawthorn-blossoms have blown off, becomes as noisy in its particular way as Whitechapel, or parts of the Borough. Now come forth your dealers in wonderful news, with loud voices, announcing third editions of the *Times*, *Post*, and *Standard*. German bands, which have been travelling in the provinces, "discourse" very decent music. The butcher, the poulterer, and fishmonger are roused from their few months of torpor, and the sound of rolling wheels scarcely ceases from midday till the approach of early dawn. The porter has now assumed his chair of state and dignity of costume: the halls are lined with stalwart attendants, clad in their peculiar costume.*

As the trees in the squares get thick with leaves, the bustle in the west increases; and long after the other districts have been in as quiet a state of repose as can be expected in this vast metropolis, the humming sound of the neighbourhoods of fashion may be distinctly heard in the suburbs. Hearing these and other voices of this city, in the gloom of night, thoughts arise of the many sad phases of the huge population which is here congregated, and hope is felt for the time when there may be a better understanding between the west and the east, and when the energy which is used in following the round of fashionable life may be, to a considerable extent, directed towards raising up and improving those thousands of human beings who are, now, even worse, than lost.

A PROTECTIVE COVERING FOR LEAD.

Will you permit me, in answer to "Subscriber," to say I have found upon several occasions two coatings, of "equal proportion," of *dry white lead* and *red lead*, ground "by hand with stone and muller," in turpentine, and then thinned up with gold size and turpentine to the consistency of ordinary paint, not only render an old cistern sound, *provided there are no cracks in it*, but also prevent a new one, or lead pipe, for years, from being destroyed. I can speak from several years' experience, and would gladly give you, in my rough way (upon your promise to shield me from the ire of my brother plumbers, the anger of Mr. Zinoman, the wrath of Master Slate-worker, and the venom of Gutta-percha and Co.) the result as follows:—

No. 1. A draught-pipe of pump was eaten through in twelve months: a second one was laid down with the same result: a third one was fixed with the above coating, and, for aught I know, remains there at work now: it is from four to five years since it was laid down.

No. 2. In a cistern supplied with pump or spring water, the bottom was entirely eaten through in a very short time: a second one was soldered in, and I believe to be at work, and has no sign of imperfection: it had three coats of the above composition nearly three years ago.

No. 3. A very large cistern was "fixed in *such a place* as none but a surveyor can direct" (and did Nena Sahib only know of it, he would use his utmost to get there),—"supplied with river water," quite new seven or eight years: after drying it thoroughly two years since, I painted it three times with the foregoing composition, and last week examined it, and found it perfect.

An Artizan.

NUMBERING AND NAMING THE STREETS.

I perceive the Board of Works have commenced a very necessary reform, by amalgamating the "terraces," "rows," &c. of the New-road into the "Euston-road" and "Marylebone-road," with consecutive numberings from end to end. I see, also, that they have judiciously placed the odd and even numbers on opposite sides, but a great improvement in the matter would have been to have made them run with the course of the river, and it would be well in future numbers to do so in those streets which run parallel with the river; and in such as run at angles from the river, to cause them to commence from the river, and proceed northward or southward as they are north or south of it.

In re-naming the streets, I perceive, from the list recently given, that no definite philosophic plan has been attempted, but that a purely arbitrary nomenclature has been adopted.

The various congeries of streets and squares ought to have been arranged in groups, and appropriate names given in each locality. For instance, something of the following system should have been adopted:—in the City we should have the names of Glasgow, Manchester, Birmingham, Lyons, Hamburgh, &c.

Near the Docks—Liverpool, Bristol, Hull, Southampton, &c.

Covent-garden and Drury-lane—Shakspeare, Massinger, Ben Jonson, Knowles, Talfourd, Garrick, Macready, Kemble, Siddons, &c.

Lincoln's-inn, Gray's-inn, and the Temple—the names of eminent lawyers.

Near the hospitals—those of distinguished sons of Galen.

The termini of the railways—the towns through which these railways pass.

Pimlico might rejoice in the titles borne by the Royal Family and the aristocracy.

Near the Palace of Parliament, the names of senators; and around the Government Offices, diplomatists.

About the Tower, and other military buildings, might be grouped the names of warriors and noted battles.

Near the Tunnel and bridges, those of engineers; in Lambeth, of archbishops of Canterbury, &c.*

In new localities, where there are no associations to suggest names, the main street or square might bear the name of some distinguished author or philosopher, or warrior, and the subordinate streets those of their works; as for instance—Sir Walter Scott's-square; Waverley-street, Rob Roy-terrace, Lammermoor-crescent: or, Wellington-square; Talavera-street, St. Sebastian-row, Badajoz-crescent, Waterloo-terrace.

Were this system adopted and carried out, as it might be, the facilities for ascertaining the locality of any place would be considerably increased; whilst the plan suggested in the Board of Works Report would only tend for a time to mystify and puzzle the wenders of the huge metropolis, and never be clear and comprehensible.

Fred. Ross.

COVERING FOR GREENHOUSE FLUES.

In reply to "C. H. K."—First. The best description of covering is the 12 or 14-inch square paving tiles or bricks: between each joint of the tiles lay a piece of iron hooping, an inch and a half wide, and use for the joints of the tiles a fine close joint of mortar, composed of lime, loam, and fine pounded brickdust, the inside of the flues being first well pargetted.

Second. That the first eight or ten feet are likely to suffer from the heat is true, and the application of cast-iron plates, say a quarter of an inch thick, as a first covering, is desirable, with the tile above, in manner as described, leaving a space of an inch and a half or two inches filled nearly in with sand: thus the iron will have room to expand (or a covering of Welch fire-lumps may be employed).

Third. To the inquiry if the flues in their course may descend as well as ascend—Yes, and without detriment, if proper judgment be exercised in the formation of the same.

A Bricklayer of Experience.

THE JOINTING OF MASONRY.

WORKS IN EXETER.

It is to be hoped that the attention your correspondent has lately called to the compo-work recently done in Exeter will not be without its good effects. The restorations, too, for ever going on about the cathedral—to the credit of the Chapter be it spoken—would, no doubt, be all the better done under the eye of an architect; but a practice prevails in that city and neighbourhood which is almost worse than the continuation of plaster and slapdash—which needs the voice of *Punch* or your own good-natured strictures to discourage—and that is the unscientific and dishonest way in which the walls—whether of squared ashlar, or of rough or irregular range—are pointed: it is regular tuck and point of the bricklayers dabbed on—sometimes half a foot wide, projecting about half as much where there are joints, and sometimes where there are none at all; no matter, so that regularity and squareness be produced: and what is worse, the coarse joints, most of which are all the coarser from having the corners and arrisses on the face broken off, are filled and brought level with common mortar, on the surface of which, while green, some fine rubble is scattered, to complete the sham, and then over all is dabbed on the tuck and point!

There are architects in Exeter of reputed celebrity who must know a better way of doing such work, unless they consider such practical details beneath their notice, and leave it all to the mason; just as a celebrated civil engineer once told the House, in reply to a question put to him about some iron-work, that "the blacksmith would attend to that."

In your number, 176 (1846), your friend "X." well describes the pointing of ancient masonry, "All must be real." Pray tell the ecclesiastic mason in *Semper Fidelis*, that in pointing no mortar should ever project beyond the surface of the work; nay,

* Horace Walpole, who was considered the man of taste of his generation, only wore hair powdered in the winter months: in summer he had his plain wig carefully brushed. Might it not be worth while to consider the footmen in this respect?

* It must be understood that we continue to protest against any but the most absolutely required changes in the names of old streets. These have associations which compensate a thousand-fold for an occasional inconvenience.—Ed.

that it should be rather a trifle within it, and formed with a weathered or sloping surface, allowing the bed of the ashlar course above it to protect it rather: and that every joint should tell its own tale honestly, and mark distinctly the form of every irregularity, whether natural or rough from the hammer, of every stone. The Church of St. Lawrence, which has called forth these remarks, is a sad specimen of the mode of pointing prevailing in the locality: it is well to know that no architect has been employed about the work. At the Training College near the city, built a few years ago, the architect has set an example how pointing should be done where the stone-work is irregular. At Plymouth they understand the thing well, and at other places in the county; but in Exeter and its neighbourhood tuck and point seems to be the way thought necessary in all work of restoration where the walls are built of hewn ashlar. Much of it is dislodged by the first frost, and none can last many years; and so the last state of a renovated building becomes almost worse than it was before it was touched. X. Y. Z.

RECENT PATENTS.*

W. Clark.—*Improvements in Air and Waterproof Coatings, and in their Applications.* (A communication.) Dated Dec. 26, 1856.—This relates to coatings to be employed particularly in dyeing and painting, in the preservation of moulded plasters, porous stones, and organic pervious alterable substances. It is a kind of artificial leather composed of gelatine and tannin. The patentee imprints or coats the objects to be treated with gelatine, isinglass, or glue, and after drying soaks them in a solution of tannin, or of matters containing tannic acid, such as nutgall, sumach, boblah, or oak bark.

F. Walton.—*An Improved Plastic Composition, and in the Application of Machinery for Manufacturing the same.* Dated January 20, 1857. — This consists in an improved plastic composition made of lacs or other resins possessing properties combined with fibrous substances for imparting tenacity and strength, and if requisite with colouring matter to improve the appearance. Also, in the application of masticating machinery, and of a heated cylinder, furnished with a piston rod and screw for preparing the composition, and keeping it in proper condition for working. Also in the application of ornamental forms with the composition.

L. W. Watkins.—*The Manufacture of a Putty to be used in Glazing, &c.* Dated January 3, 1857. The improved putty is a composition of two parts of an oil obtained in the refining of rape and linseed oils, and commonly known as black acid oil, from its containing sulphuric acid, which acid is used in the refining of the said oils, added to one part of any alkali in solution, and mixed with it in a vessel, until, by continual stirring, it assumes a creamy or soapy appearance. It is then mixed by hand labour, or any other mechanical force, with a sufficient quantity of whiting, until it attains the consistency of dough, when it is termed putty.

William Edward Newton, Chancery-lane, London.—*Tracing Cloth.* (A communication). Dated March 5, 1857.—The improved process of manufacture is as follows:—The patentee first prepares a composition of the following materials, although not confining himself to the exact proportions named. Eight parts by weight spirits of turpentine or camphine, eight parts castor oil, two parts Canada balsam, one part balsam copaiva. This combination, when well mixed, is to be applied to the tracing muslin as by means of a sponge, spreading it evenly over the surface. The sheet is rolled up and allowed to stand for thirty-six hours or so; it is then unrolled, and any excess of composition is to be rubbed off. It is then to be again rolled up for a like period, when, if on uncoiling it the surface does not appear to be dry, it must be further rubbed or wiped. It is then to be rolled again, and in two weeks thereafter will have become fit for use.

M. Trattles.—*Improvements in Tools for Cutting Cylindrical and Conical Forms.* Dated January 6, 1857.—For long cylindrical articles the patentee avails himself of a lathe; but for smaller the tool is rotated by hand. The mandril is hollow, to receive the wood to be cut, and the front end of the central opening is bell-mouthed. In the side of the mandril is a diagonal recess, deep enough to expose the interior of the mandril, and to permit of the edge of a flat blade projecting therein. These blades are secured by clamping screws, which permit of their adjustment or removal for sharpening. Rotary motion being given to the mandril, the wood is rapidly reduced.

John Wheatman and John Smith, Sheffield.—*Grinding Circular Saws.* Dated March 14, 1857.—This invention consists in substituting for the grinding body at present in use a common sand or grinding stone in saw grinding machines, in which the edge or periphery of the grinding body acts directly upon the saw secured to a table or bed-plate.

George Marshall, Morpeth, Northumberland.—*Saw-setting Apparatus.* Dated March 16, 1857.—In carrying out this invention, the apparatus is constructed with a novel arrangement of fence and spring or a lever to answer the same purpose. The fence has two or more set screws to move it backwards and forwards, or to secure it when adjusted to suit the setting of saws, and has also a rest for the saw-plate. The spring used in one mode of constructing the said apparatus is made so that when the punch is struck it operates to press the saw-plate firm on the rest, and at the same time is so arranged as to force the punch up after each stroke. The fence may be variously worked, and the apparatus may be modified to suit frame, large, and different kinds of saws.

J. Wilson.—*Improvements in the Manufacture of Steel.* Dated Jan. 2, 1857.—These consist in roasting or calcining granulated cast iron, and afterwards melting the roasted metal to obtain cast steel. Also in obtaining steel from rich iron ores by substituting such ores in place of bar iron in the usual process of cementation to obtain steel, and in melting the product so obtained with from 6 to 8 per cent. of oxide of manganese to obtain cast steel.

Edward Manico, Buckler's-bury, London.—*Obtaining Foundations for Marine or other Structures.* Dated April 24, 1857.—The patentee terms his invention a "Caisson de fer:" it is a hollow fabric of iron, its shape may be diamond or square, &c. He confines himself to no size. A caisson of a cubic yard in capacity (to the description of which he confines himself in this specification) will contain about one ton of stones, and when bedded in sand or shingle, the interstices between the uneven sided stones will receive from ten to twelve hundred weight of sand or shingle, which will work into the caisson, and form a solid mass, which, with the iron of which the cradle or caisson is made, will, when in position, weigh upwards of four tons.

* From the lists published in the *Mechanics' Magazine* and other journals.

PROVINCIAL PORTRAIT GALLERIES.

Whilst appreciating fully the attempts in the metropolis to establish schools and galleries of art, we have long been most earnestly impressed with the necessity which exists for fostering similar institutions in the large towns throughout the country. In Birmingham, Glasgow, Manchester, Edinburgh, and a few other places, there are periodical exhibitions of pictures by living artists, which are not only beneficial to the public taste of these spots, but are also of great benefit to the rising artists, who have in many instances been indebted to these local exhibitions for gaining that knowledge of their powers which has induced them, often with the best effects, to try their fortunes in the metropolitan.

We have now, however, more particularly in mind the collection of portraits, of our eminent men, which it is proposed to form in London, and feel regret that it does not make so much progress as the importance of the idea deserves. Valuable as such a collection of the portraits of the great and noble men of the whole land will be in this centre of our population, it should not prevent the formation of local collections. Much good might be done in such large towns, for example, as Manchester, Birmingham, &c. by collecting into one place the portraits of the chief men who have distinguished themselves in literature, science, or art, and have been instrumental in advancing the condition of their own district, or the country at large.

In other instances, the chief town of a county might be selected for this purpose; and many will be surprised, when they think on the subject, to find what a large number of worthies their neighbourhood can boast of, who might be usefully placed as patterns before the rising generation. Many of the town-halls throughout the country are bare of pictorial decoration, and nothing could be more appropriate than the hanging of these public buildings with portraits of eminent townsmen. Supposing this principle to be acknowledged, care would be taken in the building of future town-halls to render them fit for this purpose. These local collections should, in all instances, be as complete as possible, and easy of access.

Some neighbourhoods are more abundant than others in the production of remarkable men, and some seem to grow geniuses of a peculiar description: for instance, some famous painters have been reared in Devonshire. From Ipswich and the neighbourhood several men of note in both art and literature have proceeded. The city of Bristol might collect a goodly company of celebrated persons. Without, however, mentioning a long list of places, it is evident that few, if any, of the least note, would be unable to get together a gallery which would be an inducement and an encouragement to the rising generation.

The writer of this particularly noticed the need of such local exhibitions during a visit to Northumberland, which can boast of a long array of famous characters. On the banks of the Tyne, in comparatively recent times, the two Bewicks, John Martin, the painter, George and Robert Stephenson, &c. were born. Lord Collingwood first saw the light near North Shields. Gardener, the author of "England's Grievances," was born at the same place. The two great lawyers, Lords Eldon and Stowell, were born in a narrow lane leading from the Quay-side, Newcastle. Hutton, the mathematician, who was at an alum-pit, received some education and kept a school in the town previous to his promotion to London. Morrison, the Chinese scholar, was a native of this place. The unfortunate Luke Clennel, with some companions who did not arrive at the same eminence, studied the art of painting in a garret near the Black Gate. Akenside, the poet, was born in a picturesque house in the Butcher-bank, which still exists. Peter Nicholson, who has done so much to spread knowledge amongst the artizans of this country; Fairbairn, the engineer; and a large number of others less generally known to fame, have been connected with the ancient borough; and in different places there are fine portraits and busts of most of these men, which are scattered about to little purpose, for they are but little seen. This matter has been before referred to in the *Builder*, but we deem it advisable to bring it again before our readers.

NOTES UPON IRON.

The iron trade has experienced a convulsion since our last, for which few persons out of South Staffordshire, and not a large number in it, were prepared. Several firms had severely suffered by the failure of Glasgow and Liverpool, superadded as they were to the shutting off of all remittances from America. This latter circumstance had occasioned a somewhat heavy drain to be made upon the resources of the Wolverhampton and Staffordshire Bank, whose directors in consequence began on Wednesday in last week to refuse the customary accommodation for paper taken by their customers in the ordinary course of business. The effects which followed were of the most serious character. Ironmasters who had been trading largely with bills were brought to a stand, and by Monday last three firms had issued circulars announcing that they should be compelled to call their creditors together. The Bank opened on Monday with assistance from the Bank of England to the extent of 50,000*l.* So heavy a call, however, was made upon them during that day that in the night the directors determined to suspend payment. The announcement to this effect, placed upon the doors on Tuesday morning, was received with the utmost consternation throughout the town and district, accompanied, as it was, with the receipt by creditors of circulars from two other iron-making firms. The panic which, however, had set in was allayed by the publicly-expressed assurance of the mayor of Wolverhampton that the notes would be paid in full, and by the expressed readiness of the merchants to receive them. Wednesday broke with the announcement of another iron-firm being about to call together their creditors; thus making a total of six firms so circumstanced. There is no business doing that can be noticed, and prices nominal; makers, if for cash, accepting a surprisingly low figure. The workpeople at nearly all the works have only partial employment.

Books Received.

Remarks on Secular and Domestic Architecture, Present and Future. By G. G. Scott, A.R.A. London: John Murray. 1857.

We must content ourselves on the present occasion with mentioning the publication of Mr. Scott's book, under the above title, containing an elaboration of those views which have been set forth in the author's own words in our pages, and have excited the ire of some correspondents. It consists of 285 pages, and is dedicated to Mr. Beresford Hope. In his preface the writer sets forth his motive and his desire. He says:—

"I want to call attention to the meanness of our vernacular architecture, and to the very partial success which has hitherto attended the attempts at its improvement: I want to point out the absurdity of the theory that one style is suited to churches and another to houses, and of the consequent divorce between ecclesiastical and secular architecture; to press upon architects who are engaged in the Gothic revival the paramount duty of rendering it consistent by perfecting it, and that on a systematic principle, in its domestic and secular branches; and, finally, to show to the public that we aim not at a dead antiquarian revival, but at developing upon the basis of the indigenous architecture of our own country, a style which will be pre-eminently that of our own age, and will

naturally, readily, and with right good-will and heartiness, meet all its requirements, and embrace all its arts, improvements, and inventions."

This is exactly what *we* want, and have always worked for. There are plenty of strong words for pponents to cavil at: thus plaster is "an *accursed hing*," and there are many excellent observations for friends to quote. "Anon, anon, sir."

Essays upon Educational Subjects, read at the Educational Conference of June 1857; *with a short Account of the Object and Proceedings of the Meeting.* Edited by ALFRED HILL, Barrister-at-law, one of the Honorary Secretaries. London: Longman and Co. 1857.

THESE are important essays, and although they, doubtless, will not of themselves fairly settle the moot question, already so much discussed, and still as far as ever from a settlement, still there has been much valuable practical information elicited at the Educational Conference, as is testified by the papers now published. The book is divided into six parts. The first contains papers chiefly on the fact of the non-attendance and early removal of children from school in this country; the second, papers on the attendance, &c. at schools on the Continent; the third, papers chiefly on prize and certificate schemes; the fourth, on half-time schemes, and evening and factory schools; and the fifth, papers not falling under the preceding heads. Part sixth is an account of the proceedings at the meetings. Among the authors of the papers are many names well known in connection with educational subjects, including Government school and factory inspectors, and others officially and practically acquainted with the statistics and the routine of schools.

A Hundred Years ago: an Historical Sketch. 1755 *to* 1756. By JAMES HUTTON. London: Longman and Co. 1857.

THIS is an interesting and amusing *olla podrida* collected by a single dip, as it were, into the life-current of the England of the last century. The miscellaneous and more amusing shreds and anecdotes of the latter portion of the volume are preceded by an historical sketch of the political bearings of the time selected for illustration. There is then given some account of the men of the day, and what they were doing; anecdotes of the dark side of society, such as the press-gang, the foot-pads, suicides, &c.; a chapter or two on the frivolous classes, and their frivolities; others on the amusements and pastimes; and these are followed up at the close by a few glimpses of society in general, and its modes of progression and of intercommunication without either steam or rail, electric telegraphs, or universal penny-postages.

This volume affords an excellent example of what may be done in our own more especial province towards the enlivenment and instruction of the present by means of reviews of the past.

Miscellanea.

BRIDEWELL HOSPITAL FOR THE CITY CASUAL POOR.—Within these few weeks Bridewell Hospital—at present untenanted, except by officials, and a large portion of its revenues altogether unappropriated, except to an ever-increasing reserve fund—has been prominently brought under the notice of the perplexed guardians of the London City Unions, as a desirable building for the housing of the casual poor, if it could be obtained for such a purpose. By diligent research into the original charter of Edward VI. and subsequent ordinances, this would appear to be only the revival of one of the legitimate purposes of the City Bridewell. A joint committee from the City unions has been appointed to confer with the governors of Bridewell, or the Charity Commissioners, as to its appropriation. Meantime, a memorial on the subject has been submitted to the governors.

ESSEX-STREET PIER, LONDON.—A correspondent states that five tenders were received, ranging from 850*l.* to 561*l.* and that the tender of Mr. J. H. Ball, 650*l.* was accepted.

BELPER CEMETERY COMPETITION. — Sir: The Belper Burial Board advertised a short time ago for designs for certain works proposed to be done at their new cemetery, to be sent in on November 6th. According to a circular just issued to the competitors, there were "upwards of 100 designs received, and *carefully* examined by the Burial Board," and returned to the authors within the short space of four or five days. I send you this information for the benefit of your numerous readers, that such a feat of agility and despatch may not pass unnoticed, but may receive that publicity which it deserves, and which your journal can so well give it. PHILOFAIRPLAYE.

*** Two other competitors complain that their drawings have been returned to them spoilt,—by the packing-paper pasted all over them.

BEDFORDSHIRE ARCHITECTURAL SOCIETY.—The tenth annual meeting of this Society was held in the Bedford General Library on the 10th inst. The attendance was larger than usual. On the table were coins and various other objects of interest. After the reading of the usual report, and the election of office-bearers, the Rev. H. J. Williams read a paper entitled, "Notices connected with the History, Architecture, and Antiquities of Glastonbury Abbey;" the Rev. W. Airy one by the Rev. J. Taddy on the etymology of the word "Bury;" and Mr. Monkhouse one on "Recent Discoveries at Biddenham." A shaft or well, 37 feet deep, has been found, in a gravel pit. The well was contracted by a most expensive shaft into a diameter of 2 ft. 9 in. and has no marks of abrasure, as if from any use, upon it. The contents will appear from the following quotation from the paper as reported in the *Bedford Times*:—It may seem strange to us that the Romans should have bestowed so much cost and labour in sinking a shaft 37 ft. deep to receive the remains of one individual; but there is the shaft and there is the skeleton, there are all the paraphernalia of sepulture, the altar, the statue of the deity to whom it was dedicated, and the remains of the victims offered in sacrifice: so we must seek for an explanation of what appears to us so absurd and paradoxical in the character and customs of the Roman people. He then pointed out the points of resemblance between the pit at Biddenham and those at Ewell, Stone, and on Mount Aventine. Mr. Akerman, who was present on its being opened, remarks that this mode of interment was practised by the Romans in Britain, and was calculated to protect the remains of the dead from insult and desecration. The shaft on Mount Aventine, at the very gates of the Imperial City, was 51 ft. deep and about 3 ft. in diameter, and at the bottom was a vault or columbarium, with niches in the side for receiving cinerary urns: the chamber also is stuccoed and painted with the greatest care; so that a clear identity of purpose is shown between these three pits and the one at Biddenham. They were all Roman and all sepulchral.

STRIKES, &c.—While thousands are being thrown out of employment from failures and sheer want of work at Glasgow, the journeymen joiners in that city (1428 in number) are out on strike on a question of wages. We are glad to hear, however, that there is a prospect of a compromise with the masters, who have met their men half way by offering 5d. an hour, or 0½d. less than the men contend for. Meantime a committee is arranging as to the relief to be given to the unemployed at Glasgow, and it has been resolved to provide work in return for relief, and to give food rather than money for such work as can be given. At Belfast numbers of skilled tradesmen are walking the streets without employment, and others are proceeding by every steamer to England and Scotland, where their prospects of work at present are by no means encouraging.

OLD HACKNEY CHURCH TOWER.—Few who travel along the line of the North London Railway omit to notice the picturesque grey tower of old Hackney Church. It is an object amongst the masses of modern buildings which is not only pleasant to the eye, but gives rise to thoughts of progress and other times. The body of the old church was removed, but persons of taste in the parish determined to save the tower, which stands amongst trees in the churchyard. We heard with regret a short time ago that this venerable remnant of suburban antiquity had fallen so much out of repair, that the police surveyor had condemned it as being dangerous. It appears, however, that the body of the building is sound enough, but that parts require care. A meeting has been held with a view of saving the tower, and the lord of the manor has pledged his word that funds shall be forthcoming for the necessary restoration.

THE ADELPHI THEATRE.—Some romantic scenery has been painted by Mr. Pitt and Mr. Brew, for a piece of glamour, called "The Legend of the Headless Man," wherein Mr. B. Webster plays with his usual power. Some of the effects are very well managed.

DUDLEY DRAINAGE PLANS.—The plans and specifications for the drainage of Dudley being completed by Mr. William Lee (but not yet carried out), the Board of Health applied for his account up to the present time. The summary is as follows:—

"Self, 312 days, at 63s.	£982	16	0
Assistants, 657 days, at 16s.	526	0	0
Clerks, 1,234¾ days, at 8s.	493	18	0
Clerks, 27 days, at 5s.	6	15	0
Cash paid for travelling expenses	83	17	10
Ditto for stationery	63	10	7
Ditto for parcels and postage	0	13	9
Total	£2,157	11	2"

The estimated cost of the sewerage is 40,000*l.* The account was referred to a committee of the whole Board.

THE BELLS AT WESTMINSTER AND ST. PAUL'S.—It is a curious coincidence that the great bell at St. Paul's appears to have met with a disaster like that which has befallen the modern monster bell at Westminster, before the building was completed. Allan Cunningham, in his life of Wren (Lives of English Architects, Painters, and Sculptors), alluded to it, vol. iv. p. 234, as being one of the charges brought against Wren by the Commissioners of St. Paul's, as a fraud from bad workmanship, to which, with other alleged frauds and abuses, Wren most satisfactorily replied (see pamphlets on this controversy), showing that the authorities had allowed the great bell to be improperly struck with a hammer by the public for a money consideration!—C. C. N.

FATAL EFFECTS OF IMPURE AIR.—On a coroner's inquest on a child, at Bedford, according to the local *Times*, it appeared that the room in which the parents and child slept was very small, being only seven feet by six feet, and that the chimney was stopped up, and there was no opening whatever for ventilation. Some of the jurymen who visited the house were unable to stand the fœtid atmosphere of the room. The jury returned the following verdict:—Death from convulsions, caused by inhaling impure air in the room in which the deceased slept.

PRINTING FROM VENEERS.—A process of veneering by transfer is mentioned with approval in the French journals. The sheet of veneer or inlaying to be copied is to be exposed for a few minutes to the vapour of hydrochloric acid. This novel plate is then laid upon calico or paper, and impressions struck off with a printing-press. Heat is to be applied immediately after the sheet is printed, when a perfect impression of all the marks, figures, and convoluted lines of the veneer is said to be instantaneously produced. The process, it is affirmed, may be repeated for an almost indefinite number of times. The designs thus produced are said all to exhibit a general wood-like tint most natural when oak, walnut, maple, and the light-coloured woods have been employed.

STEEL.—Messrs. Galloway, of Manchester, are said to have joined Mr. Bessemer, and are constructing extensive works at Sheffield, for the manufacture of steel, under the provisions of his several patents. Mr. Bessemer has also the works of an eminent manufacturer in Glasgow placed at his disposal, for the purpose of carrying out his improvements,—"which," says the *Mining Journal*, "we are glad to learn, have now proved of practical value. The question of steel-making," it adds, "has now assumed an importance that must arouse the trade to inquiry; Mr. Bessemer being enabled to manufacture plates of any diameter, according to the length and breadth of the rolls employed, and at a reduction of cost calculated eventually at 10*l.* to 8*l.* per ton,—dependent, in fact, on competition, as the best steel can be produced at the same cost as common iron. The whole of the tools used in the extensive works of Messrs. Galloway, Manchester, are manufactured from 'Bessemer steel,' and we believe are examples of excellence."

FIRE AT WORSLEY-HALL.—A fire broke out at Worsley-hall, near Manchester, the seat of the earl of Ellesmere, on Friday evening, in last week, and destroyed four servants' bedrooms surrounding the apartment in which it is supposed to have originated. A great amount of damage, however, was caused by the water which was thrown upon the house, and which penetrated through every room from the roof to the entrance-hall. The amount of damage is estimated at 3,000*l.* to 4,000*l.* A view of this mansion, some of our readers may recollect, was given in *The Builder* a few years since.

WIMBLEDON, SURREY.—It is arranged, we are told, to erect at this place a village Club-room, with reading and lecture rooms and library. A residence forms one angle of these, and at the opposite extremity, projecting from a large oriel in the reading-room, there is to be a Church-service room. The designs for these buildings are in the hands of Mr. Teulon, who is appointed the architect. The whole will be in brick, varied: the style is rather Early Decorated. There is a distinction in the Church-service room from the other buildings: it has a semi-ecclesiastical character. It is expected that the work will shortly be commenced.

A SANITARY COMMISSION FOR THE ARMY IN INDIA.—I have read with much interest your remarks on the important matter of preserving the health of our soldiers in India. Should you have time to look into the late Mr. Buckingham's pamphlet, published by Partridge and Okey, in 1853, entitled "The Coming Era," you would be additionally assured of the great importance of your suggestions.

S. E. M.

*** We are confidently informed that our observations have not been useless, and that the Government is at this moment discussing the necessity of following the course we have urged. We have to add, that the design selected is by Mr. Edward Holmes, of Birmingham.

THE LATE MR. WOOLCOTT.—Mr. Woolcott, of Hereford-street, Park-lane, described as "an architect and builder," destroyed himself last week. At the inquest, his brother, Mr. George Woolcott, secretary to the Mid-Kent Railway, said that for some time past he had been in a low, desponding state of mind, which witness attributed to the unwearying attention he paid to his profession. There was nothing else that would tend to distnrb his mind. The jury returned a verdict of "Temporary Insanity."

GAS-LIGHTS.—OIL-GAS FROM THE SUNFLOWER.—It is well known that coal is not the only substance which supplies gas for illumination. It may be procured from oil (and the best for this is the sunflower oil) in sufficient quantities. Some persons prefer the light from "oil-gas," as softer and more grateful to the eye, more silvery and moon-like; but it must be admitted that it is inferior in strength and intensity to that procured from coal. However, in distant countries, where coal is not only scarce but extremely dear, the sunflower might be cultivated on an extensive scale for its oil, to be hereafter used for the purposes of lighting.—J. B. N.

BRIDGE TRAFFIC.—The arrangements for passing over London-bridge answer so admirably, would you oblige the public by recommending the following rules for passing over Blackfriars-bridge:—1. The foot passengers to go over the *left side* to the water.—2. Carriages going at a walking pace, to keep close to the curb.—3. Carriages going at a trotting pace to keep the middle roadway.—4. All carriages to be furnished with full strength to draw their loads up the incline.—5. That no stoppages be allowed on the bridge.—L.

SEA-WATER FOR MAIN-DRAINAGE.—It has often been proposed to bring the sea to London by pipes alongside the railway. Why should not this be done and keep a constant stream of salt water through our sewers of sufficient volume to liquefy their contents *at all times?* The gases would, by this means, become innocuous; and when the sewage reached the open channel proposed by the Government referees, it would flow forth on either side the river without danger to the localities through which it passed. To accomplish my scheme the *bulk* of the rainfall should find its way into the Thames by natural gravitation. I make my proposition from having seen, for many years, the sewage of nearly 2,000 persons daily poured into a milldam of salt water without offence to the neighbourhood; and I have made other experiments that confirm my belief that the "open sewers" need not be a bone of contention between Sir Benjamin Hall and the Board of Works.—A. F.

CHOWEN'S BELL-BUOY FOR THE GOODWIN-SANDS.—The form of the bell-buoy invented by Mr. G. Chowen, of 49, Burr-street, St. Katharine's-docks, has been improved, but we are not aware that the authorities have done anything as yet in the matter. An experiment is very desirable. The invention is a hopeful one. It is described by Mr. Chowen in a small tract titled "A Voice from the Goodwin," of which we have heretofore spoken.

TENDERS

For the fittings at Messrs. Barber and Smith's, Cornhill. Mr. W. E. Williams, architect:—

Piper and Son	£1,250	0	0
Drew	629	0	0
Yardley (accepted)	593	0	0

[We give the above as sent to us, but apprehend there must be an error somewhere.]

For building new offices for the proprietors of *The Morning and Evening Star* newspaper, in Dorset-street, Salisbury-square, Fleet-street. Mr. E. Walters, architect, Manchester. Quantities supplied by Bunker and Herring:—

J. and C. I'Anson	£3,176	0	0
J. M. Macey	2,869	0	0
Browne and Robinson	2,690	0	0

Messrs. Gwynne's Tenders.—We have received a communication from Messrs. Gwynne's architect, wherein he says, in reply to "J. P.'s" observation on the difference in the amount of tenders;—

"Although I am practically acquainted with the building business, and have for the last twenty-five years been in the habit of taking out quantities and measuring off works, I informed Messrs. G. that I did not approve of taking out quantities for my own works beyond what I had done for our private use; the Messrs. G. therefore, had them taken out by a surveyor, an entire stranger to myself.

I would mention a cause of much difference in the amount of estimates, namely, 'the now full manner of taking out each and every individual portion of work, however trivial, without explanation; and also the fulness of some dimensions.' Some builders price all items, others only part: in the present case I give an instance of the contractor's agent practically using his own judgment, and examining my drawings; and on comparing them with the quantities, he considered it unnecessary to put a price to many items: *two* would have produced a heavy amount, namely, 4,986 *feet close planking and strutting, with close boarding to loose ground side of trenches, if required.* This item caused an examination of the proposed work to be executed, and to ascertain if the quantities were taken, the full depth for excavation, including concrete; and also, if extra width was allowed for the proposed planking. A very trivial charge was put down for the whole of this work, to what it would have been if fully priced out: the specifications did not state that it was imperative to be done: that rested with the contractor; the full depth of excavation being 6 feet; the concrete, 2 feet 6 inches thick by 4 feet 6 inches wide.

Other matters could also be named, to show that it is essential for the benefit of all parties the architect should not take out the quantities required for his own works; but that it is *essential* two surveyors should be employed, one on behalf of the architect, and the other on that of the builders. All parties would ultimately reap a benefit, including the *individual* who has to expend the money. The architect would place himself in an independent position of the builder: errors would be guarded against which lead to litigation and annoyance—"the Braintree case to wit:" the builder would have his claim against the surveyor without giving offence to the architect: were he to do so, in some cases, he might lose future employment from such person.

I have also to call your attention to the system now adopted of sending in two tenders by one contractor, each, as a matter of course, in a different name. Should the two be the lowest of the number sent in, the lowest of the two is then withdrawn. B. LAY."

TO CORRESPONDENTS.

Boiler Grates for Heating Greenhouses.—In reply to the inquiry of "P." Mr. Allen, of Worship-street, Finsbury; Messrs. Bailey, of High Holborn; Mr. John Shewen, of Sevenoaks, and some other manufacturers, say that they have arrangements to meet his requirement. We are departing from our rule, however, in mentioning this.

B. C. B.—J. B. Paddington (a contract having been made for the execution of the Brotherton memorial for the sum originally named, there would seem to be no advantage in showing that it *ought* to cost more).—J. B. D.—S. H.—F. G. L.—W. J. (the use of zinc in such a shape would not be advantageous).—R. A. R.—An Old Subscriber.—India (a little out of our path).—J. M. (letter sent shall appear. Does our correspondent know Mr. I'Anson's accounts of these buildings, read at Institute of British Architects?)—H. J. B. (under our limit).—Mr. H. O.—G. W.—C. S.—J. L. (next week).—A.—P. W. M. (a member, apparently, is not excluded until he is two months in arrear. He may withdraw his subscription within twelve months *after the expiration of* the two months).—W. M. (the subject has been mooted several times in our pages).—L. B. (declined with thanks).—H. A.—C. D.—C. W.—J. W. R. (the assertion that rewarded design for subways is taken from Mr. R.'s pamphlet, has already been made in our pages).—R. R.—J. S.—T. G. D.—A. R. C. H. (apply to Weale).—W. A.—B. L.—T. S. B.—C. B.—T. R. S. (shall have attention. What was the magistrate's decision?)—J. R. C. and A. B. (shall have attention).—B. J. jun.—X. Y. Z. (in type).—E. H.—J. L.—(in type)—F. P.—A. B.

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